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ABSTRACT

An experimental, pilot operation of computer-based reference search services to users on a fee-for-service basis was initiated at M.I.T. as the first module in the development of the Northeast Academic Science Information Center (NASIC) under a New England Board of Higher Education (NEBHE) program. The development encompassed, among other tasks, selection of services, training for services, developing the initial organizational and operational policies and capabilities, publicity about available services, and the operations monitoring procedures. A fundamental philosophy was to integrate these services within the library environment where they complement traditional services. Initial experiences during a three month operational period showed that (1) a demand exists for computer-based reference search service; (2) users are willing to pay, even out-of-pocket, for such services; (3) searches are often interdisciplinary and require several sources; (4) various publicity mechanisms are helpful but none so important satisfied users telling their colleagues; and (5) users like and respond positively to the in-depth, customized service and personal attention to their bibliographic needs. (WCM)

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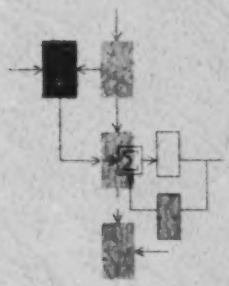

NASIC AT MIT - Phase 1 Report
16 July 1973 - 28 February 1974

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NASIC AT MIT

PHASE 1 REPORT

16 JULY 1973 - 28 FEBRUARY 1974

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An experimental, pilot operation of computer-based reference search services to users on a fee-for-service basis was initiated at M.I.T. as the first node in the development of the Northeast Academic Science Information Center (NASIC) under a New England Board of Higher Education (NEBHE) program. The development encompassed, among other tasks, selection of services, training for services, developing the initial organizational and operational policies and capabilities, publicity about available services, and the operations monitoring procedures. A fundamental philosophy is to integrate these services within the library environment where they complement traditional services. Initial experiences during a three month operational period show that (1) a demand exists for computer-based reference search services; (2) users are willing to pay, even out-of-pocket, for such services; (3) searches are often interdisciplinary and require several sources; (4) various publicity mechanisms are helpful but none so important as satisfied users telling their colleagues; (5) users like and respond positively to the in-depth, customized service and personal attention to their bibliographic needs; (6) extensive training and practice of Information Specialists is necessary to attain desirable levels of service quality; (7) integration of these services within the library environment may require organizational and staffing accommodation in addition to the personal cooperation, good will, and enthusiasm of participants.

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This report represents the first phase of effort by a NASIC at M.I.T. project team. Two vital components of the team are the M.I.T. Libraries and the Information Processing Services. Their respective directors, Natalie N. Nicholson and Robert Scott, take active interest in the development of NASIC on the M.I.T. campus and the contributions by them and their staff are valued.

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Our appreciation is also extended to Phillip Piper, the Assistant to the NASIC Coordinator, for his help in the coordination of the various activities supporting the service.

Progress has been helped by communications among team members. One major aspect of the communications process is the memoranda among participants. Appreciation is extended to the project secretaries, Susan Garland and Karen Parry, for their expeditious handling of the documentation.

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I. INTRODUCTION AND OVERVIEW

An experimental, pilot operation of computer-based reference search services to users on a fee-for-service basis was initiated at M.I.T. on 15 November 1973. It marks a major milestone in the development of the Northeast Academic Science Information Center (NASIC). NASIC development is supported by a grant from the National Science Foundation to the New England Board of Higher Education (NEBHE). Development of a pilot operation at M.I.T. is supported by subcontract from NEBHE to M.I.T. The NASIC at M.I.T. project team includes staff from the M.I.T. Libraries, the Electronic Systems Laboratory, and the Information Processing Services. This report covers the work performed on NASIC at M.I.T. from 16 July 1973 through 28 February 1974. This period falls within Phase 1 of NASIC.

Services for a fee have been provided to more than 60 users. Although the number of users is small at this still early stage, the ranks of users continue to grow with the increasing publicity about the availability of NASIC services. The effort to reach this stage by the M.I.T. project team encompasses, among other tasks, selection of services, training for services, developing the initial organizational and operational policies and capabilities, the publicity about available services, and the operations monitoring procedures. A philosophy fundamental to this effort is to integrate such services within the library environment. Details of the work accomplished on each task are contained in subsequent sections. The reader is referred in particular to Task 12, Monitoring and Analysis of Service Operations, for an extended analysis of results.

It is worthwhile highlighting the more important findings to date of this development and testing effort. They are:

1. A demand exists for computer-based reference search services available on a fee-for-service basis.

2. A measure of the strength of the demand is that many users are willing to pay out-of-pocket for such services, although the majority of users to date have access to contract or grant monies.

3. Mechanisms need to be established to support large-scale use of NASIC services by undergraduates and others who do not have access to grant or contract monies.

4. These services complement but do not replace more traditional search modes.

5. A significant number of user search problems are interdisciplinary in nature and may require searches in more than one data base.

6. Various publicity mechanisms are successful but, not unexpectedly, the most important one seems to be satisfied users telling their colleagues about NASIC.

7. Users like and respond positively to the in-depth, customized service and personal attention to their bibliographic needs.

8. To provide quality service Information Specialists need to receive training including fairly extensive practice searching. It takes additional experience for an Information Specialist to become fully confident, adept, and at ease with his or her professional ability to provide an intensive customized computer search.

9. To date, a typical NASIC user appointment lasts 70 minutes. Somewhat more than half that time, 37 minutes, is spent in on-line connection to the computer. The average printout request results in 39 pages containing 131 citations. The total cost of a typical search is $50.47 composed of $34.90 for computer connection and search and administrative charges, $ 9.36 for the time of an Information Specialist, and $ 6.21 for off-line printout. However, only 60% of users request offline printout.

10. Integration of these services within the library environment may require organizational and staffing accommodation in addition to the personal cooperation, good will, and enthusiasm of participants.

The discussion by task which forms the body of this report relates to the M.I.T. environment. The NASIC at M.I.T. organization reflects this environment as well as the dual purposes of providing user services and

of developing and testing methods and types of services. As such, the current setup at M.I.T. represents only one of many organizational models; we want to experiment with other models. The particular method that other institutions use to organize NASIC computer-based reference services on their own campus must reflect their own local environment and needs. The M.I.T. experience ought to be of help to other universities in setting their own course.

There are several aspects of the work accomplished within the short span from commencement of M.I.T. effort on 16 July 1973 to 28 February 1974 which cannot be adequately expressed either in the highlights above or in the following summary by task. NASIC is an addition to library services at M.I.T. and not a replacement for traditional services. This is expected to hold true for NASIC service sites at other educational institutions in the region. The extension of services in a short time span to include NASIC has caused an additional burden to be carried by the M.I.T. Libraries. The M.I.T. Libraries did not have benefit of time for budgetary planning. Nevertheless, whenever problems arose, the long view of the situation was kept in mind by all concerned. Some of these problems may also arise at other sites and NASIC and the participating institutions need to give it full consideration. Regular work loads and personnel assignments in the M.I.T. divisional libraries have been disrupted during the transition period to build, operate, and continue further development and growth of NASIC services. The Information Specialists themselves have shouldered most of the burden, but in the process, and with their enthusiasm, they have shown their mettle. The administration and staff of the M.I.T. Libraries have enthusiastically supported efforts to make NASIC services a success while tolerating the transitory hardships to personnel and regular work loads associated with the magnitude of their effort.

Despite the usual trials in this development effort, it is obvious to us at M.I.T. that no matter how much or how little is available in dollars or in time, people still make the difference. Enthusiasm and committment are prerequisite for any university library staff that wishes to extend its services to computer-based reference and retrieval.

At M.I.T., we have wrestled with an important question. If each university sets its own operational course what then is the role of the Northeast Academic Science Information Center? NASIC does have a role to play, a very positive role. We have arrived at this answer by careful review of the activities and events to launch and carry forward NASIC services at M.I.T. in which the M.I.T. departments that have cooperated in this venture can be likened to a NASIC network in miniature. The major functions of a strong central regional NASIC organization are:

1. Advise academic institutions on preparing for, implementing, and publicizing computer-based reference services.

2. Offer programs to train staff to levels of competency in understanding and providing such services that extend beyond current programs of retrieval system suppliers.

3. Provide a central capability to search those systems or data bases that are only of infrequent use to an academic institution.

4. Provide a strong, collective voice for the region in dealing with retrieval systems, data base suppliers, terminal manufacturers, or other external agencies.

5. Provide a mechanism for disseminating within the region updated information and solutions to problems of common interest.

In short, a regional NASIC is needed to function as a strong user association, a center with the expertise and time to daily make suggestions and provide feedback among individual academic institutions and a variety of diverse information or equipment suppliers.

Our prognosis for NASIC remains optimistic. It is possible for an organization to implement these services entirely on its own; but in so doing, more of its resources will be required in order to fully realize the benefits from extending its services to both current and new library users. These services are exciting because they ultimately touch upon, indeed should be integrated with, a wide spectrum of information services, but they are also exacting in their implementation if their potential is to be realized. A NASIC that functions as a strong central association of members could considerably ease this process with consultation, with training,

with back-up services, with collective voice to suppliers, and with feedback to members.

II. DESCRIPTION OF PROJECT WORK BY TASK

Obtaining Service Data From External Suppliers (Task 1)

Data describing the characteristics, modes of access and costs of available external online and offline bibliographic services was gathered and reviewed. This data gave assistance to the selection of retrieval systems and data bases for initial NASIC services. Sufficient data for both on-line and off-line modes is on-hand to assist in the selection of additional data bases as sources of NASIC services. However, the external retrieval systems and data bases undergo continual modification and change so the data gathering effort also continues in order to keep abreast of such changes.

Part of the data gathering effort has taken place in conjunction with the NEBHE-ARL site survey study. M.I.T. has participated directly in site surveys at the University of Georgia, Illinois Institute of Technology Research Institute, University of California at Los Angeles, Ohio State University, University of Florida, and the North Carolina Science and Technology Research Center. M.I.T.'s role in these visits has concentrated mainly on the current and planned services and operations of these centers.

A visit with the staff of the System Development Corporation yielded new information and data on ORBIT. M.I.T. has received visits from representatives of SDC, Lockheed, and the University of Georgia which have also been beneficial in obtaining recent data.

Selection of Services (Task 2)

The ultimate long-range NASIC goal is to provide access to most computer-based information services. Four areas of interest have been considered: (1) data bases, or machine-readable bibliographic or other surrogate records; (2) data banks, or machine-readable numerical data, either raw or reduced; (3) text files other than surrogate records that are computer-stored; (4) non-computer stored (traditional) information.

The first area, data base or bibliographic access, was a given for NASIC services and it forms the core of NASIC activity for the forseeable future. NASIC will use the services of existing retrieval systems and data bases rather than develop processing capabilities of its own. While access to all such bibliographic services is desirable and necessary for comprehensive coverage, an initial set of services had to be selected. Other bibliographic retrieval services will be phased in over time. Time to accomplish training of personnel is a critical element in the introduction of all such services.

NASIC services at M.I.T. were initiated on line with the SDC ORBIT system and offline with the University of Georgia system. The SDC ORBIT system was selected for several reasons. It is somewhat easier to learn to use the ORBIT retrieval system than most others. It is accessible via the TYMNET network making communications easier. It had, last August, more data bases of interest to the M.I.T. community. It is essentially the same retrieval system as the National Library of Medicine MEDLINE system access to which was being arranged concurrently but independently by the M.I.T. Science Library. The University of Georgia system was selected because it has the largest array of data bases in the country, many of which are searchable in both retrospective and current awareness modes.

Specific data bases available on those systems were also selected for initial operations. The on-line data bases include the Chemical Abstracts base (CHEMCON), plus data bases in education, linguistics and information science (ERIC) and in business, management, and economics (INFORM).

These data bases are of interest to large segments of the M.I.T. community. Other data bases available at that time on ORBIT but not selected were in medicine (MEDLINE) and agriculture (CAIN). There is a large interdisciplinary interest at M.I.T. in the medical data base but SDC's service was not selected because concurrently with NASIC services, MEDLINE service is being made available (and at lower cost) by the M.I.T. Libraries through arrangement with the National Library of Medicine. However, a cooperative spirit and effort exists at M.I.T. in providing NASIC and MEDLINE services to the ultimate benefit of both the user community and the growth in usage of computer based retrieval systems in general.

The offline data bases initially selected for access from the University of Georgia are the Chemical Abstracts Condensates and ERIC. This selection complements or extends the data base time period coverage and type of service provided by the on-line data base. Thus, a full range of services is being provided for each data base whenever possible. Retrospective searches are available both on-line and off-line. Current awareness searches are available off-line, although ORBIT has plans to provide such a capability. The relatively new INFORM data base is the only SDC data base that does not have an off-line counterpart at Georgia.

Since the time of selection of initial data bases for NASIC, SDC has made available data bases in engineering (COMPENDEX), geology (GEO-REF), and is expected soon to make available government reports (NTIS), and a citations index (ISI). NTIS, CAIN, COMPENDEX and GEO-REF are currently available off-line at Georgia. While a detailed plan for phasing-in other data bases and retrieval systems is in preparation, these particular data bases are of interest to the M.I.T. community and there is a high probability of adding them next. A contributing factor in the choice is that specialist training in the use of these data bases can be accomplished sooner than would be the case if, in addition, a new host retrieval system first had to be mastered. However, the effort in testing additional retrieval systems for eventual use is continuing and is now being aided by the use of real search problems. Indeed, comprehensiveness of bibliographic data base coverage is one of the most valuable features that NASIC can provide.

The NASIC effort is being concentrated on bibliographic data base access. NASIC access to data banks of machine-readable numerical data, either raw or reduced, such as, for example, the census, was considered. However, numerical data bank access was deferred for the present in order not to dilute the available resources necessary for successful training in data base access and because information specialist personnel with backgrounds additional to that of data base specialists, particularly in programming, are required. However, M.I.T. and NEBHE studies of this area do indicate the desirability of having effective interaction and referral between data bank specialists and data base specialists.

Further consideration of the third area, machine-stored, full-document text files has also been deferred because of the very limited number of sources at the present time.

It is particularly important to conclude this summary on selection of services with a note that a conscious and continuing effort is being made to develop an effective interface between the NASIC computer-based information services and both traditional searching and document delivery systems. While NASIC is primarily concerned with computer-stored information, non-computer-stored information is of particular concern for at least two important reasons, both of which are highly likely to influence a user's opinion of the effectiveness of NASIC services. First, most, if not all, machine-stored data currently available, have limited retrospective capabilities (on the order of a few years for most bibliographic sources). Some number of users will have need to search further back in time. Hence an effective interface needs to be designed between computer-based information services and traditional searching. Second, both traditional and machine-based bibliographic searches on document surrogates usually generates a need to obtain access to the full documents. Hence, an effective bridge between machine-based NASIC services and a document delivery system (from holdings determinations through delivery) also is highly desireable. The initial NASIC effort is giving full consideration to the interface with traditional resources. For example, the reference staff is being given sufficient information to be able to refer users to NASIC; the reverse situation also arises because some users who come to

NASIC have information needs answered in part by, or only by, traditional sources. In the next phase, we plan to experiment with document delivery services as a means for following through and completing the retrieval function.

The ultimate goal is, of course, an integrated set of information services available to a user community at M.I.T. or at any other NASIC site.

Library Staffing and the Selection of Information Specialists (Task 3)

An initial core of five Information Specialists were selected, one each from the reference staffs of the five Divisional Libraries at M.I.T., to provide NASIC services part-time. A sixth Specialist was subsequently brought on board. The Information Specialists are:

Ms. Marge Chryssostomidis	-	Barker Engineering Library
Mrs. Pat Gordon	-	Science Library
Ms. Ann Longfellow	-	Rotch Library
Mrs. Jackie Stymfal	-	Dewey Library
Ms. Nancy Vaupel	-	Humanities Library
Ms. Susan Woodford	-	Science Library

The selection of Information Specialists reflects the general organization of the M.I.T. Libraries which are decentralized into five divisions corresponding to each of the five schools (Engineering, Science, Architecture and Planning, Management, Humanities and Social Science) at M.I.T. Each Divisional Library could be expected to interface in some way with NASIC. To handle the interface and to generate and maintain interest in NASIC throughout the total Library system, the Library Administration selected a part-time Information Specialist from each Divisional Library rather than one or two Specialists for the total library system.

The Library Administration asked the Head of each Divisional Library to recommend one of their staff members for the job. Although no formal selection criteria were established, in point of fact the most important informal selection criteria were previous experience with computer-based services and/or a high level of interest or enthusiasm in such services. Selection of Specialists was accomplished without any difficulties. Two of the initial core of five Specialists had previous experience with computer-based bibliographic services, in particular, Intrex, MEDLINE, and several batch systems. Personal interest and enthusiasm from the other Specialists did indeed rank high, (one concurrently took a programming course at M.I.T.).

The M.I.T. Libraries are providing, in parallel with NASIC services, access to the National Library of Medicine MEDLINE system. The Libraries sent one staff member from the Science Library to participate in the 3-week Medline

training program. While NASIC and MEDLINE services are parallel services, from a user's viewpoint, this represents proliferation and is a potential source of confusion for him. It seemed highly desirable to provide a single point of access to any computer-based information source for the M.I.T. user community. A coordinated effort can be and was implemented with greater convenience to both user and staff while also providing appropriate sponsorship credits and maintaining appropriate cost allocations for contractual obligations. To this end, the initial core of five NASIC Specialists was enlarged such that the MEDLINE trainee was additionally trained to provide NASIC services also. MEDLINE is a member of the ORBIT retrieval system family and this fact has facilitated the coordination.

Although an initial core of NASIC Information Specialists had to be selected, we would expect that, in time and with increased user demand, the entire reference staff of the M.I.T. Libraries would be trained to provide computer-based reference and retrieval services. Indeed, several members of the reference staff have expressed such an interest.

Development, implementation, and the management of operational activities within the Libraries requires coordination, a fact recognized from the outset in pre-contract discussions. The decision later to use a decentralized staff of Specialists underscores the role of a Coordinator. Ms. Mary Pensyl is the NASIC Coordinator and she has had previous experience in the use and promotion of computer based information services. The NASIC Coordinator reports directly to the Library Administration. As we move into Phase II, the NASIC Coordinator will be less concerned with development and implementation but instead, address more attention to publicity and marketing.

Subsequent development of service operations at M.I.T. pointed up a distinct need for support capability. An Assistant to the NASIC Coordinator, Mr. Phillip Piper, was hired to carry out the duties of manning a telephone to receive and answer inquiries, to schedule and carry out all arrangements for service appointments, to maintain user files, to handle billing and accounting procedures that flow through the Coordinator's Office, to distribute all off-line printouts sent to this central office, to gather data on the service operations and to assist in its reduction.

Access to External Services (Task 4)

Accounts have been obtained by NEBHE for use by M.I.T. to access the SDC ORBIT system in an operational service environment. Other SDC accounts obtained by M.I.T. are being used for training and experimental testing purposes. Two accounts have been obtained by NEBHE for use by M.I.T. to use the University of Georgia System; one account will be used for service operations and the other for training and experimentation. Accounts have also been obtained by M.I.T. to access the Lockheed DIALOG and the Battelle BASIS-70 systems for testing and training pruposes.

Training Program (Tasks 5 and 8)

A training program began in late August 1973 and continued through mid November 1973 in order to achieve by the time of the initiation of NASIC service operations a comfortable level of understanding and ease of use of each of the initial NASIC retrieval systems and data bases by all of the Information Specialists. Training was particularly intensive in the few weeks immediately prior to initiating services. (At M.I.T., MEDLINE is being coordinated with NASIC as a service activity, but MEDLINE was not part of the NASIC training program. MEDLINE services are currently being provided only by the two Specialists from the M.I.T. Science Library both of whom had previously received MEDLINE training at NLM. Their MEDLINE service activities are in addition to their NASIC service activities.) Since 15 November 1973, a small amount of continued training has occurred to keep abreast of changes in the initial retrieval systems and data bases, and to discuss and review the operational experiences of the Specialists. Of course, additional retrieval systems and/or data bases that are to be accessed as a NASIC service will require additional training effort equivalent to comparable segments of the initial program.

The initial training program required approximately 130 man-hours (3.7 man-weeks) of effort per Information Specialist. About 40 man-hours effort per Specialist were devoted to the first module of the training program. Bibliographic and information science concepts independent of specific retrieval systems and data bases were covered and a general philosophy of service was discussed. Major topics in Module A were:

-- search problem elicitation
-- profile or search concept development
-- Boolean concepts
-- natural language and controlled language characteristics
-- retrieval effectiveness concepts
-- other search strategy techniques
-- user search satisfaction criteria

The second and third modules together represent the bulk of the effort and together required 90 man-hours of effort per Specialist. The second

module covered the specific protocols, commands and other characteristics of the ORBIT and the University of Georgia retrieval systems, and the specific characteristics of the Chemical Abstracts, ERIC, and INFORM data bases as they are applied on those systems. The second module also included hands-on experience at terminals for ORBIT (approximately 10 hours of connect time per Specialist) and the development and running of profiles for Georgia. Several real users participated in the training effort providing us with real search problems and the opportunity to conduct reference interviews and to obtain feedback on terminology and search strategies. The third and smallest module was concerned with the NASIC at M.I.T. pilot service operational procedures and covered administrative, accounting, service, feedback and analysis, and similar matters.

The training program was an amalgam of lectures and discussions, individual study, practice online sessions in pairs and individually, user interviews, and offline profile development. Training materials included assigned readings, system and data base descriptions and manuals, system newsletters, and retrieval aids such as thesauri. NERHE personnel frequently attended the lecture and discussion portions of the program. In addition a day and a half long workshop was held at M.I.T. by Mrs. Margaret Caughman of the University of Georgia to review their system and the two data bases being accessed, to cover profile weighting, and to review profiles submitted by M.I.T. for training purposes. Mr. Ran Hock of the University of Pennsylvania also attended the workshop.

The topics covered during the initial training program are to be reviewed during the next phase of NASIC and reassembled for use in a program to train Information Specialists at other NASIC sites to a similar level of preparation and understanding in the use of computer-based information services. It is expected that the training program itself will be recast to better meet the needs of geographically dispersed trainees. It is anticipated that greater use will be made of guidelines, of "tutoring" by experienced Specialists, of apprentice search sessions. A lot of information must be covered together with a lot of practice, but it is anticipated that the training program can be so segmented as to allow time for a prospective Information Specialist to absorb the material.

Development of Operational Procedures at M.I.T. (Task 6)

An intensive effort to develop and set up operations for a pilot service took place along several fronts. The efforts can be categorized as: (a) library and other sites for service (b) terminals for on-line services; (c) service modes; (d) service charges; (e) accounting and billing mechanisms; (f) data gathering for management information and statistical purposes. These efforts on initial development have essentially been concluded Details are given on the following pages. Modifications to the initial procedures will be made on a continuing basis as further experience, feedback and analysis may dictate.

Library and Other Service Sites (Task 6A)

NASIC services are being offered through each of the five divisional libraries at M.I.T. Each library except the Science Library was surveyed together with the Head of that library in order to select particular locations within the library suitable as a NASIC service site. Criteria used to select a site included: visibility of on-going NASIC services to other library users; sufficient physical space for both users and for small group demonstrations; electrical and telephone installations; noise level, general environment, and traffic flow; ease of access to the reference collection; ease of access to quarters for secure storage of terminals. As you might expect, some tradeoffs had to be made. In some instances, particularly where large expenditures for physical improvements might have been required for an otherwise desireable location, temporary sites are being used instead pending review based on operational use. The site being used in the Science Library for NASIC services had been previously selected for MEDLINE service and it meets all of the criteria established for a NASIC site. That site has been strikingly and attractively decorated by the M.I.T. Libraries and it serves as a model for the other libraries. Sites outside the Libraries at which NASIC services are to be offered upon user request and on a test basis include the on-campus offices and laboratories of the user community. The object is to increase further the convenience of access to NASIC service for users.

Terminals for On-Line Services (Task 6B)

Texas Instruments Silent 700 thermal terminals with upper/lower case capability were selected for initial NASIC services. They are quiet, reliable, portable, and operate at 30 characters per second output, all characteristics that make them highly suitable for operation within a library environment. Two such terminals have been leased by the Project and, together with a third such terminal leased by the M.I.T. Libraries, are being shared among the five Divisional Libraires for NASIC services. A fourth terminal leased by the Electronic Systems Laboratory is being made available to NASIC for back-up purposes. While these are portable terminals, they do weigh-in at 30 pounds. Terminal logistics have been a bit of a nuisance. On occasion, the Information Specialist and user have travelled to the terminal rather than the reverse. Until user demand justifies additional terminals such that there will be at least one per library, we may, in the next phase, reduce the number of locations at which NASIC services are available. In addition, Specialists seeking online practice training with additional data bases have occasionally been hampered because the shared terminals were not close-by.

Service Modes (Task 6C)

The reader may appreciate that in preparing for NASIC services, we had to work with two unknown quantities, namely, initial user demand and its rate of growth. Therefore, considerable attention was given to determining the best modes of pilot service operation that would simultaneously permit convenience of service to users; controlled growth of service operations to meet demand when and where it arises; control over services for monitoring and analysis purposes; flexibility for easily modifying service procedures; flexibility in working with time slots when only certain on-line data bases are available; flexibility for both NASIC and for the Information Specialists in interfacing with traditional library activities; and flexibility in adding new operational services.

An appointment basis for service was selected over on-demand methods as it provides the best accommodation of both flexibility and control, particularly with limited personnel resources. In addition, the appointment places NASIC services on a more professional footing because the user is assured of undivided attention and service at the appointed hour--not a small matter when he is paying for service.

Each of the Information Specialists has been trained to work with each of the initial NASIC retrieval systems and data bases (MEDLINE excepted). A user may obtain service at any Divisional Library, or upon request, at his office or laboratory. A logistics schedule for appointments was drawn up based upon personnel and the time of day that online data bases are available. A Specialist, although attached to one library, may be asked to meet an appointment elsewhere. Appointments are scheduled centrally through the NASIC Coordination Office.

The initial appointments schedule (see Figure B1) theoretically is able to accommodate a total of 75 hours of service, 54 hours on-line and 21 hours off-line. The schedule allows the user some flexibility in arranging an appointment. The total is twice the number of hours we anticipated as being actually necessary to service a demand rate anticipated to grow to 25 users per week after the first few months of operation. Each Specialist has been scheduled to cover at some point each of the data bases and systems (on-line and off-line, and retrospective searches as well as current awareness profiles)

although some weighting has been done to provide more hours of service for the chemistry data base by the Specialists from the Engineering and Science Libraries. MEDLINE services have been integrated into the appointments schedule but such service is available only from the Science Library Specialists trained at NLM. All appointments are nominally scheduled for one-hour but the schedule allows an additional half-hour to catch latecomers and run-over sessions, as well as to allow some time for the Specialist to complete a write-up about the appointment for later monitoring and analysis. Appointments are scheduled for the time slot and location most convenient to the user. With a moderate demand level and current staff committments, we anticipated no more than a two or three day wait. The appointment mode has proven to be useful in practice but detailed discussion of the match between the plans on which service appointments are based and our real operational experience appears below in Task 12, Monitoring and Analysis of Service Operations.

In Phase 2, we want to experiment with other modes of service. These include delegated searches, SDI online services, on-demand searches without an appointment, user self-searches, service in an office or laboratory, and document delivery services. Document location and delivery services would provide an important follow-through to any of the search modes since the search result only provides references to documents. Document delivery also promotes integration of computer-based searches with more traditional library activities.

Service Charges (Task 6D)

A pricing structure for NASIC services at M.I.T. was developed. The structure is a compromise between the complexities associated with accurately predicting all costs when we have no historical cost data to go by, and a too simple flat rate that would reflect real costs inaccurately. The pricing structure has four main components whose sum is the total cost to the user. The components are (1) a direct computer search cost to which a surcharge is added for recovery of administrative costs, (2) a direct charge for the time of the Information Specialist, (3) a direct charge for the cost of off-line printouts, (4) charges for special services.

(1) Computer search costs are established as rates based upon either the number of hours of terminal connect time for on-line services, or on the number of years of data base coverage searched for off-line services. The rates are retrieval system and data base dependent. Table 1, a draft price list, shows the rates in effect from 15 November 1973 to 31 January 1974. Table 2 gives the rates in effect for February 1974. The change in the rates for some data bases reflects changes in the supplier's rates. The computer search cost rate includes (a) the actual rate charged by the external service less any discount provided to NASIC; (b) a rate surcharge added by NASIC at NEBHE to support the regional organization, this surcharge initially equal to the discount received from the external service; (c) a rate surcharge added by M.I.T. to defray its expenses in providing central personnel, telephones, terminals, and materials necessary for service. The M.I.T. administrative surcharge included in the search cost rate is currently set at $12 per connect hour or $6 per profile-year. The M.I.T. administrative surcharge of $12 per connect hour was derived by assuming achievement within the first year of an operational level of 125 users per month, with the average user requiring an hour of Specialist time and 30 minutes of terminal connect time. It was also assumed that this volume would require a Coordinator at 20% full-time, and an Assistant to the Coordinator at 60% full-time. Monthly costs were estimated for salary and benefits for the Coordinator and the Assistant,

Table 1

INITIAL RATES EFFECTIVE 15 NOVEMBER 1973-31 JANUARY 1974

M.I.T./NASIC PRICE LIST (DRAFT 11/29)

The following prices for services provided at M.I.T. for NASIC and other information services will be in effect until February 28, 1974.

A. SPECIFIC PRICES

1. Information Specialist: $8/hr. (minimum charge $5)
   [This charge is currently being credited -- see (B) below]
2. Offline Printouts: $0.10/page
   (output onto 4 x 6 cards: $0.05 per card)
3. Special Services: (prices not yet worked out)
4. Computer Search: (see Table below -- charges in dollars)
   [minimum charge for computer search: $5]

Data Base	Type of Computer Search		
	On-line*** (per connect-hour at terminal)	Current Awareness*** (annual subscription)	Offline Retrospective**** (per year of data base searched)
CA-Condensates*	$55	$370	$166
ERIC*	$44	$ 86	$ 76
INFORM	$67	OL	OL
MEDLINE**	$18	OL	OL

OL = service available only online

*The chemical and education data bases are each divided into two parts for offline searching. If your problem can be handled by only one part, pricing can be cut in half. See brochures on these data bases for details.

**The MEDLINE (Medical Online) service is being provided by M.I.T. in cooperation with the National Library of Medicine which subsidizes the major portion of the costs. One third of the MEDLINE computer search charge ($6/hr.) goes to NLM, the remainder goes to M.I.T. NASIC does not participate in MEDLINE service and collects no payment for it.

***Charge prorated if less than hour or year of service.

****Offline retrospective searching for the current year is charged on the basis of the current awareness rate -- pro rata for that portion of any incomplete volumes to be searched.

B. INTRODUCTORY CREDIT OFFER

As an introductory offer M.I.T. is crediting each new user's account with a total credit of $50 which can be used to defray the charges for the information specialist. This credit is limited to M.I.T. users and must be used before the end of this academic year in June, 1974.

Table 2

SERVICE RATES EFFECTIVE FOR FEBRUARY 1974

NASIC* AT MIT

AUTOMATED BIBLIOGRAPHIC SERVICES FOR RESEARCH

COST OF SERVICES

Effective February 1, 1974, costs for NASIC search services are as listed below.

Information Specialist: $8/hr (minimum $5). This charge is currently being credited for MIT faculty, students and staff -- see (A) on reverse side.

Computer Search: As shown in the table below, there are two rates, one for educational and government users (EDUC) and one for commercial users (COMML). In either case the minimum charge is $5.

Off-line Printouts associated with the computer search may involve an additional charge as shown in the table.

	ON-LINE SEARCH per terminal connect hour		Off-line Printout
DATA BASE	EDUC	COMML	
CA-Cond.	$ 67	$ 82	$.08/cit.
ERIC	$ 47	$ 62	$.08/cit.
INFORM	$ 67	$ 82	$.10/cit.
MEDLINE(B)	$ 18	$ 18	$.10/page

	OFF-LINE RETROSPECTIVE per year searched		Printout
DATA BASE	EDUC	COMML	
CA-Cond.			citation only
odd or even	$ 86	$ 96	paper - free
odd and even	$166	$176	card - $.02/cit.
ERIC			abstract & cit.
RIE or CIJE	$ 41	$ 51	paper - $.10/cit.
RIE and CIJE	$ 86	$ 96	card - $.12/cit.

	CURRENT AWARENESS (C) annual subscription		Printout
DATA BASE	EDUC	COMML	
CA-Cond.			citation only
odd or even	$190	$200	paper - free
odd and even	$370	$380	card - $.02/cit.
ERIC			abstract & cit.
RIE or CIJE	$ 46	$ 56	paper - $.10/cit.
RIE and CIJE	$ 86	$ 96	card - $.12/cit.

For further information see the detailed NASIC at MIT brochures or contact the NASIC Coordinator's office:

253-7746

Room 10-400

(OVER)

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SAMPLE COST CALCULATION

Assume an INFORM search by an academic user from MIT takes 45 minutes of the time of an Information Specialist (3/4 x $8 = $6.00), 30 minutes of terminal connect time (1/2 x $67 = $33.50) and results in 42 citations being printed off-line (42 x $.10 = $4.20). Total cost is $43.50, of which the $6.00 for the Information Specialist's time will be credited, leaving a net cost of $37.70.

A commercial user's cost for the same service would be $6.00 + (1/2 x $82) + $4.20 = $51.20.

EXPLANATORY NOTES:

(A) During the 1973-74 academic year, each account of a user from MIT will be credited with $50 applicable to charges for the time of the information specialist.

(B) The MEDLINE (Medical Online) service is being provided by MIT in cooperation with the National Library of Medicine which subsidizes the major portion of the costs. One third of the MEDLINE computer search charge ($6/hr) goes to NLM, the remainder goes to MIT. NASIC does not participate in MEDLINE service and collects no payment for it.

(C) The charge for Current Awareness is prorated for subscriptions of less than one year.

For further information, see the detailed NASIC at MIT brochures or contact the NASIC Coordinator's office:

253-7746

Room 10-400

*NORTHEAST ACADEMIC SCIENCE INFORMATION CENTER

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for terminal rental, for terminal paper, for telephone and message units, and for miscellaneous supplies. These costs were pro-rated among the assumed monthly user volume and translated into a connect-hour charge on the basis of the assumed half-hour average connect time per user. The M.I.T. administrative charge of $6 per profile year for offline searches was derived in the same way except that terminal cost and terminal supplies were excluded, and it was assumed that the average user would obtain a one-year current awareness profile or a one-year retrospective search. Beginning 1 February, NASIC services were extended to users affiliated with industrial or commercial orgainizations. At the request of NEBHE, a surcharge to this group of users was instituted of $15 per connect hour for online services or $10 per profile year for offline services. The industrial user surcharge is passed completely to NEBHE to help defray the real costs in developing NASIC. The National Science Foundation grant is paying the development costs for the academic community. There is no industrial surcharge on MEDLINE service because it is not a part of NASIC. The total charge to a user for the computer search cost component, including all applicable surcharges, is pro-rated for online searches under an hour, or for offline searches for less than a year, but there is a minimum charge of $5.

(2) Information Specialist time is charged at the rate of $8 per hour during an appointment with a minimum charge of $5. No charge is made when the Specialist and user together decide that a NASIC service would be inappropriate for the user's problem, or when a potential user seeks general information about NASIC services. The hourly rate for the Information Specialist was derived assuming a one-hour user appointment and an additional 10 minutes preparing for user sessions or for post-session clean-up. The rate is based on salary plus employee benefits.

(3) Off-line printout charges for the period 15 November 1973 through 31 January 1974 are shown in Table 1 and for February 1974 in Table 2. The initial rates were all on a per-page charge and, for simplification, had been set at a uniform cost for all data bases. Beginning 1 February 1974 new rates were set to reflect a significant change in the actual charge basis used by SDC. Their rates are now currently on a per-citation basis. At the

time the SDC change was impending, we thoroughly reviewed the basis of the initial NASIC printout charge in terms of cost recovery. We concluded that the printout component of the NASIC price structure for a given data base should be in concert with the structure of the data base supplier. Thus, the printout component is now retrieval system and data base dependent and is similar to the computer search component except that the printout component contains no surcharge for administrative costs. Recovery of overhead associated with printouts is to be included later with other indirect costs in the connect-hour surcharge.

(4) Special services will be charged for in addition to the above costs. Such services may include, for example, document reproduction and delivery. No special services have been developed during the Phase 1 period nor have costs and prices for anticipated services been investigated.

In order to aid in the introduction of NASIC services to the M.I.T. community, the M.I.T. Libraries are forgiving users the charge for the Information Specialist time up to a maximum of $50. This is the equivalent of about six hours of appointments. The credit is limited to M.I.T. users and must be used before the end of the academic year in June 1974.

Some readers may be interested to know that in accordance with a new National Library of Medicine policy to allow all MEDLINE users to obtain a standard mode of service at a standard price, we have announced the availability of a "standard" MEDLINE search at a fixed fee of $7.50. The standard search as defined by the National Library of Medicine is one requiring less than a half-hour of Specialist time, less than 20 minutes connect time, and less than five pages of printout. Users at M.I.T. who desire a more extensive MEDLINE search will be charged at regular rates.

Cost recovery is an essential and fundamental part of the M.I.T. pilot operation. These services must be paid for. While some NASIC host institutions may choose to absorb part or all of the costs and not charge users directly, M.I.T. has chosen to attempt direct recovery of costs. This policy has been adopted in part because the only sure way to test user receptivity of direct charges is to actually charge appropriate fees. We expect that many M.I.T. users will use contract or grant monies to pay for NASIC services and operational use bears this out. More significantly, other users have paid out-of-pocket for services. However, there are poten-

tial users, notably undergraduate students, who generally will not have access to research funds. We are currently exploring mechanisms for providing funds to cover the cost of service to these people. One possible model, for example, of sources of funds for student use of NASIC goes along lines similar to dollar support in many places of student use of computational facilities.

A discussion comparing the assumptions underlying the user charges for service with our actual experiences appears later in Task 12, Monitoring and Analysis of Service Operations.

Billing and Accounting Mechanisms (Task 6E)

Another large effort was invested in the development of a mechanism to handle the billing and accounting activities of the initial NASIC pilot service. The existing services and facilities of the M.I.T. Accounting Office are being used as much as possible. The Accounting Office is handling the financial transactions associated with NASIC service and they interface, for billing purposes, between NASIC and the user. Accounts representing each library site plus the NASIC Coordinator's Office have been set up through the M.I.T. Libraries and, for each account, reports by object class for different categories of income are furnished to the NASIC Coordinator by the Accounting Office. However, while M.I.T. retains control over the financial interface between the local NASIC service and the charges to and payments from its users, NEBHE retains control of the financial interface between NASIC services at M.I.T. and outside search services. All bills from outside agencies for services purchased by NASIC at M.I.T. are sent to NEBHE for payment. NEBHE, in turn, bills M.I.T. through the Coordinator's Office for the cost of such services plus a surcharge equal to any discount received by NEBHE from the supplier. NEBHE is apprised of external services purchased by users of NASIC at M.I.T. by either copies of orders and/or reports sent periodically to NEBHE by the NASIC Coodinator's Office. These reports include industrial usage of services; the industrial surcharge collected by M.I.T. is passed along to NEBHE.

This initial phase mechanism could serve as a model for NEBHE in setting up service sites at other institutions, whereupon the local institutional accounting office handles the billing from those NASIC sites to users at those institutions. NEBHE would act as a collection agency only when the local institution could not.

The initial phase operation is currently being tested in practice and the general flow of materials and information is described below. The initial billing and accounting operation functions around a requisition and a word order.

1. At M.I.T., users may pay for NASIC services in several ways:
   a) by authorized requisition against an internal M.I.T. account

b) by purchase order from an external organization

c) by cash receipt showing a deposit made to a NASIC account with the M.I.T. Bursar

d) by personal check

e) for M.I.T. users only, personal billing.

In all cases, the user is given an estimated cost of service, based upon an hour appointment, at the time he arranges his appointment.

2. At the appointment, the user presents his requisition, purchase order, or cash receipt to the Specialist, if payment is by one of those modes. Then, the user and Information Specialist together accomplish a work order based on the user's information problem. At the completion of service, the work order contains the cost to the user for services rendered and the user receives a copy for his own records. The user is also told of the nature and rate of any other costs, such as for off-line output, that are to be billed to him later. The work order indicates whether industrial rates apply. (See Figure B8.)

3. The original work order is forwarded together with any requisition or purchase order to the NASIC Coordinator's Office. The Assistant to the Coordinator prepares from it either a clean order for an off-line external service, or a summary report of any on-line services already rendered. A clean order is sent to the external agency providing the offline service. Copies of a clean order and/or a summary report are sent to NEBHE as notification of services purchased externally by M.I.T. on accounts maintained by NEBHE with those agencies for M.I.T. use.

4. When NEBHE receives an invoice from an external agency, NEBHE makes all payments to the agency and forwards the bill for those services together with any NEBHE surcharge to the M.I.T. NASIC Coordinator's Office. The Coordinator's Office verifies and forwards the bill to the M.I.T. Accounting Office for payment to NEBHE.

5. In the meantime, a copy of the user's work order, with object classes entered against services by the Coordinator's Office, is forwarded to the M.I.T. Accounting Office. All supplementary bills,

such as for off-line output, are prepared by the Coordinator's Office and forwarded to the Accounting Office. The Accounting Office charges the user's account and handles all collections, account transfers, and refunds. The Accounting Office furnishes reports to the M.I.T. Libraries and its NASIC Coordinator's Office.

For MEDLINE services, billing and accounting function as described above except that a) NEBHE is not in the flow and b) bills from the National Library of Medicine are received directly by M.I.T.

As an aid in the computation of charges, Specialists have rate sheets showing the cost by minute for on-line connection to each data base, and for Information Specialist time, and the cost by page or citation for off-line printout. A rate sheet for CA Condensates is shown in Figure B12.

Data Gathering Procedures for Management Information, Qualitative Evaluation, and Statistical Summaries (Task 6F)

The initial operational procedures described in this report have been set up with monitoring and evaluation of services in mind. Data is being gathered in several ways for input to an analysis effort (see Task 12 below). A number of forms have been prepared to capture data during or immediately after an event. Several of the forms are included in Appendix B of this report. Development of the initial data gathering procedures is near completion.

Because of the centralized appointments mode, NASIC publicity names the Coordinator's Office as the place to contact for all inquiries. An inquiry data sheet has been prepared to capture, for example, data about the caller, whether by phone, by mail, or in-person, his location and status, the nature of the inquiry, and the responses given. If an appointment is made, then date, time, and place are noted along with anticipated services, payment method, and problem title. The inquirer is always asked about how he learned of NASIC services. If no appointment is set up, an attempt is made to ascertain the reason. If the inquirer is interested in a data base or service not yet available, his name, location and interests are entered into a special file so that we know what these are and we can personally notify him when such services, or closely-related ones, are made available. In addition, some of these users can aid us in experimentally testing new services under consideration. (See Figures B2, B3, and B4.)

Many inquiries will not come initially to the Coordinator's Office. Many will first be received elsewhere within the library system. The entire library staff is being asked to refer inquiries to the Coordinator's Office or to the Information Specialist in that library. Printed post cards (Figure B5) have been distributed to help accomplish this referral during non-busines hours. Most importantly, an orientation program for the library staff is nearing completion so that the staff (a) may be in a more know-

ledgeable position about NASIC (particularly the reference staff), (b) can identify with NASIC as a major library activity, and (c) can help NASIC reach a wider audience.

A user who makes an appointment is sent a reminder (See Figure B6) as to time and place, and, if it applies, to bring a requisition or purchase order. The user also receives a problem statement form and is encouraged to complete it and return it before his appointment. (See Figure B7.)

The problem statement form is modelled after those typically used by off-line search centers. The objective is to capture a natural language description of the problem and to define its boundaries. This statement is exceedingly useful if properly completed because the user has then thought about his problem beforehand. If it is returned in advance of the appointment, the Specialist will also have reviewed the problem. The user problem statement serves both the Specialist and the user as a common ground, a point of departure for further probing in working out search terminology and search strategies. The narrative portion of the user problem statement is the most important part. It is essential that the user not attempt to structure his problem at this stage by guess or preconception in anticipation of how material relevant to his problem is indexed. The narrative is more meaningful than lists of phrases or words because it provides additional context by interrelating the phrases. It provides essential details typically absent in search titles. The remaining portions of the user problem statement are useful for the Specialist in at least two ways: (1) it provides additional handles useful in interpreting search feedback, and (2) it can aid in increasing search precision (more limited results) should that be necessary. The user problem statement is also useful in later analysis of the search session and its effectiveness.

The work order captures the essentials of the services rendered to the user. It contains the specific time length, charge data, and method of payment for a user session. The charges to the user are classed by object code for accounting reports. This data is essential to determining the cost recovery effectiveness of the pricing algorithm. (See Figure B8.)

An appointment session log (Figure B9) allows the specialist to capture in free form important decisions and problems that arose during the session. Capture of details of technical problems serve as a basis for securing credits form external agencies as well as providing them with feedback on the quality of the services they are selling.

Off-line outputs are sent to the Coordinator's Office so that (a) user charges can be calculated and billed if these charges were not previously included on the user's work order, (b) identification numbers appearing on the printout can be deleted as a precaution against unauthorized use by others of these numbers, (c) a legend for interpreting coded data on the printout can be enclosed, (d) a thank you for using NASIC can be attached, and (e) an evaluation form covering services and output can be enclosed for subsequent return by the user. As of the date of this report, the legend and the evaluation form have not yet been completed. When full document delivery service is established, a mechanism integrating it with search output will be developed.

The Information Specialists are keeping detailed time breakdowns of their NASIC activities. This information is essential not only for contractual committments, but also for understanding the nature of an Information Specialist's job, and for determining costs of activities. (See Figure B10.)

The Information Specialists also keep a terminal log for all log-on connections and printout requests, whether for training, for experimentation, or for operational services. This data is used in verifying the external agency invoices, and for determining costs of activities beyond that of a user search session proper. (See Figure B11.)

The data that is gathered must be reduced and analyzed. Our initial work on analysis is presented later in Task 12, Monitoring and Analysis of Service Operations.

Marketing and Publicity (Tasks 7 and 10)

Plans for marketing and the development of promotional materials constituted a major effort and it was carried forward in cooperation with the NEBHE staff.

Early on, the characteristics of the major channels of publicity at M.I.T. were identified. In addition, statistics were gathered about the M.I.T. population by department and laboratory and by status, as, for example, faculty, students, staff, visitors. Information already compiled at the Institute in the form of directories to the major research interests of the M.I.T. community was also collected. The population and research interest data has been used in the selection of data bases and in the determination of selective mailing lists by department. The publicity channels primarily used to-date center around news releases, brochures, mailings to selective identifiable groups, meetings, and demonstrations.

Several brochures specific to NASIC at M.I.T. were prepared and added to an earlier brochure produced by NEBHE describing the general objectives of NASIC. One of the new brochures for M.I.T. gives an overall picture of the initial NASIC services available at the Institute. This general brochure is complemented by three others, each containing important general information but each also contains content specific to a different data base--one in chemistry, one in education, and one in business. A fourth brochure, prepared and produced at M.I.T. expense, covers medicine. A price list complements all the brochures. The price list is illustrated in Table 2. The brochures are illustrated in Appendix C.

The publicity events included, in chronological order:

1. An initial news release to Tech Talk, the M.I.T. Community weekly newspaper, appearing 12 September 1973 and describing the NASIC subcontract effort at M.I.T. This release coincided with the beginning of the Fall semester. The release was issued to the Associated Press and was picked up by at least the following national and local newspapers: The New York Times (23 September 1973), the Worcester, Mass. Gazette (20 September 1973), and the Fall River, Mass. Gazette (20 September 1973).

2. At the invitation of Miss Nicholson, Professor Reintjes spoke to the M.I.T. Library Council on 17 October 1973.
3. Miss Nicholson spoke about NASIC before the M.I.T. Faculty Council meeting on 7 November 1973. This was an agenda item for their monthly meeting.
4. A letter prepared by Miss Nicholson announcing the opening of NASIC services on 15 November was sent together with a copy of the General Brochure to all 2600 M.I.T. faculty and staff members on 12 November 1973.
5. The campus student newspaper The Tech interviewed Miss Nicholson and Professor Reintjes about NASIC services and ran their article on 27 November 1973.
6. The letter by Miss Nicholson to faculty and staff and the General Brochure was sent to all 1388 M.I.T. research assistants and teaching assistants on 29 November 1973. One or more brochures on specific data bases were included in the mailings to all 374 graduate students in selected departments. The chemistry brochure was sent to those students in the Chemistry, Chemical Engineering, Biology, Metallurgy and Material Science, and Nutrition and Food Science Departments. The medicine brochure was also sent to students in some of those departments. The education brochure was sent to students in Foreign Literature and Linguistics. The business brochure was sent to students in Economics.
7. An article about NASIC services appeared in Tech Talk on 5 December 1973.
8. William Duggan and Alan Benenfeld spoke before the M.I.T. Administrative Officers regular monthly meeting on 20 December 1973. The billing and accounting interface with NASIC services was emphasized.

9. A letter sent by Miss Nicholson to each library staff member about the opening of NASIC services was a prelude to a series of orientation meetings held beginning in December by the NASIC Coordinator and the Information Specialists with the staff of each library. The meetings were to familiarize the staff with NASIC services and to further encourage development of effective communications and coordination between traditional library services and computer-based library services. Considerable emphasis is placed on NASIC as an integral part of library services.

10. A Chemical and Engineering News reporter was referred to the NASIC Coordinator by the Tech Talk Office. A brief announcement appeared in the 24 December 1973 issue of Chemical and Engineering News. Some inquiries by non-M.I.T. people were received as a result of that announcement.

11. A series of six online demonstrations and one seminar plus demonstration about NASIC services were held in January during M.I.T.'s Independent Activities Period (IAP) by Mary Pensyl and the Information Specialists. There were two demonstrations of the education data base, one of chemistry, two of business including one at the seminar, and two of the medical data base. The demonstrations consisted of 10 minute introductory talks, a 20 minute prepared search to illustrate features of the data base, and a 10 minute question and answer period. The seminar consisted of a 30 minute discussion followed by a 20 minute prepared search and a 10 minute question and answer period. Approximately 120 people attended the demonstrations and about 20 people attended the seminar. These activities drew a mixture of M.I.T. faculty, students, and staff, in addition to a number of non-M.I.T. personnel, particularly librarians from other schools in the area. We know of three appointments that resulted from this effort. One M.I.T. department began to investigate the possibility of setting up funds for its students to draw upon for NASIC services.

12. A two-day Symposium was held on 7-8 February 1974 at M.I.T. and jointly sponsored by the M.I.T. Electronic Systems Laboratory, the M.I.T. Libraries, and the New England Board of Higher Education. The symposium covered two topics: (1) reports on the results of Project Intrex, and (2) reports on the status of the Northeast Academic Science Information Center. Invitations were extended to the Deans of the fourteen graduate library schools in the northeast and to the Heads of 43 university, college, and other large research libraries, also all in the northeast. Each institution was invited to send two representatives. Sixty persons attended. Natalie N. Nicholson launched the NASIC portion of the program with an "Introduction to NASIC at M.I.T." on Thursday evening. Professor Reintjes introduced the Friday program which included presentations on "The Background and Objectives of NASIC" by David Wax, "A Rationale for NASIC at M.I.T." by Richard Marcus, "The Development of NASIC at M.I.T." by Alan Benenfeld, "The Integration of NASIC into the M.I.T. Libraries" by Mary Pensyl, and the "Future Plans of NASIC" by David Wax. The program concluded with demonstrations by the Information Specialists of the NASIC facilities in the M.I.T. Libraries.
13. On 1[illegible] February 1974, the Lincoln Laboratory Library Director, Mr. Lloyd Rathbun, was sent several hundred copies of each of the NASIC brochures and price list for distribution to Lincoln personnel. An announcement about NASIC appeared in the 15 February issue of the Lincoln Laboratory Library Scanner. A Lincoln Laboratory bibliographer, Ms. Sara McNeil, was named as a contact person for Lincoln staff. Lincoln has since issued a purchase order through their Library for NASIC services.
14. The letter by Miss Nicholson was revised and it and the General Brochure were sent on 15 February 1974 to all 767 staff at the Charles Stark Draper Laboratory, Inc.
15. The M.I.T. Industrial Liason Office in mid-February contacted by telephone about 20 firms in the Greater Boston area about the availability of NASIC services. This was a follow-up to a previous letter by ILO announcing that services to the industrial community would be forthcoming.

16. On 20 February 1974, David Wax and Alan Benenfeld spoke before the Special Libraries Association, Boston Chapter, Science-Technology Committee. The development of NASIC and its implications to special libraries were discussed. About 80 librarians from the Greater Boston area attended. Several inquiries from attendees at that meeting have since been received about providing services to particular libraries. We are aware of at least one announcement, in the Massachusetts College of Pharmacy Library's bulletin, of NASIC services.
17. On 5 March 1974, a demonstration and discussion about NASIC was held at M.I.T. with 8 librarians from the University of Massachusetts, Boston. Information about NASIC services has since appeared in their library bulletin.
18. On 10 March 1974, a revised letter by Miss Nicholson was sent along with copies of brochures and price list to Miss Helen Brown, Director of the Wellesley College Library for distribution to Wellesley faculty and staff. M.I.T. and Wellesley have a cross-registration program and other reciprocal agreements.
19. On 14 March 1974, Mary Pensyl gave a presentation on NASIC services in the M.I.T. Libraries at a joint meeting of the Harvard and M.I.T. Library Staff Associations. About 60 persons attended.
20. On 1 April 1974, Mary Pensyl spoke on NASIC as an M.I.T. Libraries service to 30 persons attending a meeting of the M.I.T. Women's Forum.

The service site in the Science Library was strikingly repainted by the M.I.T. Libraries. Consideration is now being given toward a similar effort at some of the other service sites to enhance visibility and command attention. Plans for effective displays of brochures at each site are underway as are plans for poster displays.

Word-of-mouth advertising by satisfied customers about good, efficient, and effective NASIC service is a most desireable goal. To this end, the Information Specialist training program and the library staff orientation meetings have been particularly sensitive to furthering the initial enthusiasm, espirit-de-corps and cooperation among all participants, backed up by the development of coordinated procedures for effective service.

Our experiences to date indicate that all publicity mechanisms will yield some response but that word-of-mouth advertising is gaining in predominance. As Phase 2 gets underway, consideration is being given to new avenues of publicizing services, in particular, personal contact with potential prime user groups. We also plan in Phase 2 to survey both users and non-users of NASIC services. An initial evaluation of the marketing effort and some plans for further effort are given later in Task 12, Monitoring and Analysis of Service Operations.

Testing of Service Procedures (Task 9)

During the two week period preceding the opening of services, dry runs on parts of the operation were held. These were concentrated entirely on interviewing and performing searches with trial users. Testing of all other procedures is being done under real conditions of service as part of the continuing monitoring and analysis of the operation (see Task 12).

Initiate Service (Task 11)

This task represents a major milestone in the history of NASIC. On Thursday, 15 November 1973, NASIC at M.I.T. officially began services by taking appointments for service beginning Monday 19 November. Interestingly enough, inquiries were received at the Coordinator's Office on 14 November from faculty and staff who had already begun to receive the announcements sent to them. Service operations were launched just four months after the start of M.I.T.'s subcontract. Task 12 below summarizes and analyzes the activities following the start of a service operation.

Monitoring and Analysis of Service Operations (Task 12)

The discussion of each of the preceding tasks has been mainly a descriptive report of the design, development, and implementation activities associated with NASIC services. In this task we look at the service operations themselves and compare design with practice. Feedback from monitoring and analysis of operations is vital not only to making changes to the operation or to the policies governing the operation, but also to understanding better the functions being performed and the needs of the user community. Because we have been on-the-air for only a limited time, feedback has been useful so far mainly to improve understanding and to modify general plans; few changes of consequence have been made as yet to either policy or to operation. The following analysis draws upon the statistical data appearing in Tables 3 through 9, upon the descriptive reports above, and upon user receptivity reports.

It may be helpful to begin with a statistical characterization of use. All statistics refer to the period 15 November 1973, the date services began, through 28 February 1974.

There were 57 users; of these, 29 used one of the three NASIC data bases and 28 used the MEDLINE data base. All searches were online retrospective searches. There were no current awareness searches, either online or offline, and no offline retrospective searches. All searches but one were run on an appointment basis with the user present. The one exception was a second search for a user run in a delegated mode using the INFORM data base. Table 3 shows the breakdown of users by data base and by the library in which service was received. Table 4 shows the breakdown of users by organization and status for each data base. For M.I.T. campus users, Table 5 shows for each data base the distribution of data base users by department or laboratory. Table 6 shows the publicity mechanisms to which M.I.T.-affiliated users responded. Table 7 shows the methods of payment selected by all searchers distributed according to their status. The data in Tables 6 and 7 do not distinguish between NASIC data bases and MEDLINE because the data base was not expected to influence the distribution.

Table 3

NASIC AT MIT

SUMMARY DATA

15 NOVEMBER 1973 TO 28 FEBRUARY 1974

NUMBER OF SEARCHES: 29 NASIC, 28 MEDLINE

(ALL ARE ON-LINE RETROSPECTIVE SEARCHES)

SEARCH LOCATION AND DATA BASE:

	CHEM	ERIC	INFORM	NASIC TOTAL	MEDLINE
BARKER	9	1	--	10	--
DEWEY	--	2	4	6	--
HUMANITIES	--	1	--	1	--
ROTCH	--	--	6	6	--
SCIENCE	5	1	--	6	28
OTHER LIBRARY	--	--	--	--	--
OFFICE/LAB	--	--	--	--	--
TOTAL	14	5	10	29	28

Table 4

NASIC AT MIT

SUMMARY DATA

15 NOVEMBER 1973 TO 28 FEBRUARY 1974

USER AFFILIATIONS:

	CHEM	ERIC	INFORM	NASIC TOTAL	MEDLINE
MIT/CAMPUS TOTAL	12	4	8	24	25
FACULTY	5	--	--	5	6
GRADUATE STUDENT	2	2	5	9	11
UNDERGRADUATE	--	--	--	--	4
OTHER STAFF	5	2	3	10	4
MIT/LINCOLN	--	--	--	--	--
DRAPER	--	--	--	--	--
WELLESLEY	--	--	--	--	--
OTHER UNIVERSITIES (TOTAL)	2	1	2	5	2
FACULTY	--	--	--	--	--
GRADUATE STUDENT	2	1	2	5	1
UNDERGRADUATE	--	--	--	--	--
OTHER STAFF	--	--	--	--	1
GOVT. AGENCIES	--	--	--	--	--
INDUSTRIAL/COMMERCIAL	--	--	--	--	1
OTHER AFFILIATIONS	--	--	--	--	--

Table 5

NASIC AT MIT

SUMMARY DATA

15 NOVEMBER 1973 TO 28 FEBRUARY 1974

DEPARTMENT AFFILIATIONS OF MIT/CAMPUS USERS:

DEPARTMENT	CHEM	ERIC	INFORM	NASIC TOTAL	MEDLINE
BIOLOGY	1	--	--	1	1
CHEMICAL ENG.	1	--	--	1	--
CHEMISTRY	2	--	--	2	1
ELECTRICAL ENG.	--	1	1	2	1
MATHEMATICS	--	--	--	--	1
MECHANICAL ENG.	2	--	--	2	5
METALLURGY	1	--	--	1	1
NUCLEAR ENG.	1	--	--	1	--
NUTRITION	--	--	--	--	5
OCEAN ENG.	--	--	1	1	--
SLOAN SCHOOL	--	1	4	5	1
URBAN STUDIES	--	--	--	--	2
HEALTH SCIENCES PROG.	2	--	--	2	4
LIBRARIES	--	1	--	1	--
MAGNET LAB.	1	--	--	1	1
OASIS	--	1	2	3	--
PLANNING OFF.	--	--	--	--	1
SEA GRANT	1	--	--	1	1

Table 6

NASIC AT MIT

SUMMARY DATA

15 NOVEMBER 1973 TO 28 FEBRUARY 1974

PUBLICITY RESPONSE OF MIT-AFFILIATED USERS: (Combined NASIC and MEDLINE)

	CAMPUS				LINCOLN	DRAPER	TOTAL
	FACULTY	GRAD.	UNDERGRAD.	OTHER	LAB	LAB	MIT
MAILINGS (LETTERS AND/OR BROCHURES)	3	4	2	3	--	--	12
THE TECH ARTICLES	--	2	1	1	--	--	4
TECH TALK ARTICLES	--	2	1	--	--	--	3
COLLEAGUE	1	6	2	1	--	--	10
DEMONSTRATION	--	4	--	1	--	--	5
LIBRARY STAFF REFERRAL	2	2	--	--	--	--	4
DISPLAY/OBSERVER IN LIBRARY	1	5	1	2	--	--	9
*POSTER/DISPLAY OUTSIDE LIBRARY	--	--	--	--	--	--	0
REPEAT USER	3	--	--	4	--	--	7
OTHER SOURCES	--	--	--	1	--	--	1

*Not implemented in the reporting period.

Table 7

NASIC AT MIT

SUMMARY DATA

15 NOVEMBER 1973 TO 28 FEBRUARY 1974

METHOD OF PAYMENT FOR SERVICES: (Combined NASIC and MEDLINE)

	MIT-USERS						NON-MIT USERS	
	FACULTY	GRAD.	UNDER-GRAD.	OTHER	LINCOLN LAB	DRAPER LAB	ACAD.	COMM.
MIT REQUISITION	11	15	1	12	--	--	1	--
PERSONAL CHECK	--	4	3	2	--	--	6	--
CASH	--	1	--	--	--	--	--	--
PERSONAL BILL THRU MIT	--	--	--	--	--	--	--	--
PURCHASE ORDER	--	--	--	--	--	--	--	1

Table 8

NASIC AT MIT

SUMMARY DATA

15 NOVEMBER 1973 TO 28 FEBRUARY 1974

CHARACTERISTICS OF ON-LINE SEARCHES BY APPOINTMENT:

	CHEM	ERIC	INFORM	NASIC OVERALL	MEDLINE
SEARCHES BY APPOINTMENT:	14	5	9	28	28
AVERAGE ADVANCE TIME IN ARRANGING AN APPOINTMENT: (business days)	6.4	3.2	5.8	5.7	5.2
AVERAGE CONNECT TIME: (minutes)	42	36	29	37	47
AVERAGE APPOINTMENT LENGTH (minutes)	77	62	76	70	71
AVERAGE RATIO CONNECT TIME TO APPOINTMENT TIME:	.55	.58	.38	.53	.66
APPOINTMENTS WITH A MACHINE PROBLEM:	3	0	0	3	3
AVERAGE TOTAL PROBLEM TIME: (minutes)	14	--	--	14	13
OFF-LINE PRINT REQUESTS:	7	4	5	16	20
AVERAGE OUTPUT (pages):	44	44	28	39	50
(citations):	211	110	87	131	394
AVERAGE COMPUTER PLUS ADMINISTRATIVE CHARGE: (before any allowances)	$39.52	$26.95	$32.22	$34.90	$13.86
AVERAGE SPECIALIST CHARGE: (before Introductory Credit)	$10.25	$ 8.22	$ 8.58	$ 9.36	$ 9.32
AVERAGE PRINTOUT CHARGE:	$ 6.12	$ 5.33	$ 7.18	$ 6.21	$ 4.53
AVERAGE USER COST: (assuming offline printouts requested and no credits given)	$55.89	$40.50	$47.98	$50.47	$27.71

It is helpful to characterize further the search sessions within a search mode. To date, we have had essentially only one mode, an on-line search by appointment. Table 8 characterizes quantitively the features of the 28 NASIC data base searches and the 28 MEDLINE searches that were held by appointment and with the user present. The charges vary widely among the data-bases. The amount of offline printout also appears to be influenced by the size and the number of years covered by the data base. On the other hand, other parameters, which we shall examine, show little difference in usage among the data bases. Some of the fluctuations we do see may be attributed at this early stage to the one or two users at the extreme for each data base who have influenced the average values reported here. For example, the 394 citations printed offline per average session for MEDLINE is heavily weighted by two users out of 28 who received 1431 and 1338 citations respectively; excluding those users, the average MEDLINE printout contains 282 citations. This is still a large number but the medical data base is quite extensive and the figure is comparable to the more than 200 average citations printed for users of the similarly extensive chemistry data base. With a larger number of users, extreme cases will have less influence on the average values--or, indeed, we may discover that these "extremes" are not really abnormal.

The appointment itself runs some 70 minutes, of which 37 minutes, a little more than half the time, is spent in an actual on-line connection to the retrieval system, in our case either the SDC ORBIT or the NLM or SUNY MEDLINE systems. About 10% of the searches have encountered more than minor machine connection problems; occasional disconnect or line noise problems are more frequent but they are considered minor if recovery is almost instantaneous and if the search is unimpeded. If machine problems impede the search in any way, the user is given credit against his total charge for the amount of time involved.

Only 50% of NASIC users and 60% of MEDLINE users request offline printouts. The request is issued online during the search session but the printing is done offline on a high speed printer and sent by airmail. For users who have a lengthy list of references, it is often cheaper to obtain offline printouts rather than by printing online at 30 characters per second.

However, users do obtain enough particulars online so that their work can proceed until the printouts are received a few days later (on rare occasions, the next day). The average offline request runs some 40 to 50 pages. The number of citations varies with the comprehensiveness of the data base. The reason for at least some users not issuing an offline print request is that no relevant material has turned up in the search process. These negative searches are not at all uncommon or unexpected among research-oriented users who are often simply seeking reassurance that no one else has done what they propose. Although we have not specifically analyzed for the number, the percentage of negative searches is probably at least 20 or 25 per cent and may run as high as 40 or 50 per cent.

The average total charge to a user is $50.47 for searching a NASIC data base and $27.71 for searching MEDLINE. This is the charge assuming offline printouts are requested and without making any credit allowances. In this period, M.I.T. users receive an introductory credit for the Specialists's time and so the real cost to an M.I.T. user has been about $9 less in each case. The average cost of the printout component is $6.21 for NASIC data bases and $4.53 for MEDLINE. The MEDLINE printout is a per-page charge. The NASIC printout cost has been confounded by the change from a per page to a per citation charge as discussed under Task 6D, Service Charges. Since the per citation rate was in effect only for February, we expect the average NASIC printout charge to rise. The major component of the total cost to a user is the charge covering computer connection, computer searching, and M.I.T. administrative costs (cf. Task 6D, Service Charges). For NASIC the average charge for this component is $34.90 and for MEDLINE it is $13.86. The MEDLINE cost is considerably lower because the National Library of Medicine subsidizes entirely the computer search cost and because the connection cost is lower than the connection costs to SDC.

What affect does price have on data base usage? This is perhaps the most important question we can address. The availability of the subsidized MEDLINE system to the user community through the same channels as the NASIC data bases gives us some additional handles with which to begin answering

the question. At this point in time, there is no definitive answer because price is one of many confounding factors that may motivate a person to use computer-based reference services such as NASIC and MEDLINE. For example, price, marketing, need, prior familiarity with data base, availability of funds, complexity of the search, urgency of results, convenience, and influential or peer users, are all candidates to influence at least some users. Price is the easiest to measure and study but we do not yet know whether it is the most important of all factors or only one of several important factors. There may be threshold effects associated with price or other factors which influence usage. What can we tell at this time from our initial data?

There is no initial onslaught of users for any data base. The number of MEDLINE users runs neck and neck with the total number of NASIC data base users. However MEDLINE is used twice as heavily as the most frequently used NASIC data base in chemistry. Price could explain the difference between CHEMCON and MEDLINE usage but other factors may be at least as, or even more, influential. One such factor is the proportion of the total community interested in a data base. For example, the chemistry data base, CHEMCON, is used three times as often as ERIC, and the INFORM business base is used twice as often as ERIC. Both CHEMCON and INFORM are more expensive than ERIC, but more people at M.I.T. are active in chemistry research than in management research, and more in the latter than in educational research. Thus for these three areas, usage ranks in order of the size of the interested population, and not inversely with cost. What about interest in the medical research area? At M.I.T., interest in medical and health care research is known to be highly diffused throughout almost all departments. This is confirmed by the distribution of users shown in Table 5. Interest in medical science and technology and related health care systems is at an all time high nationally and at M.I.T. These are areas where research funds are more fluid but there is also a genuine trend at M.I.T., as elsewhere, to turn the attention of more of its research resources to social and environmental problems. Thus the greater usage of MEDLINE may also result from and be proportional to the number of people

having interest in it rather than it being an effect of price, even when the price is heavily subsidized. The explanation based on interest is consistent not only between NASIC and MEDLINE but also between the respective NASIC data bases. One way to test this hypothesis is to compare the ratios of data base use to the population ratios of fields of interest of researchers. We hope to tackle this in phase 2 of our work but the test is complicated by the fact that today's highly interdisciplinary research shows little respect for departments, laboratories, and even data bases initially organized and named along lines of more traditional disciplines.

If interest can explain data base use at least as well as price, are there results for which price is more clearly a major agent of influence? Analysis of Tables 4 and 7 sheds considerable light on this area. The status of our users appears to be influenced by the price. Of 49 M.I.T. campus users (24 for NASIC data bases, and 25 for MEDLINE) only 4 have been undergraduates and all 4 used MEDLINE. Undergraduates and graduate students each represent about a third of the M.I.T. professional body, the faculty about ten percent, and the research and administrative staffs the remainder. Thus undergraduate use of MEDLINE is still less than proportional to their population. On the other hand graduate students have used all data bases, and except for chemistry, in greater proportion than their population. More graduate students are involved in research than undergraduates. But even more significantly, graduate students have greater access to contract and grant monies than do undergraduates. As Table 7 shows, 3 of 4 undergraduates paid out-of-pocket (by check) for their searches, but only 25 percent (5 of 20) of the graduates paid out-of-pocket. Table 4 shows faculty and other professional staff (research and administrative) use. Other staff use has been much higher than expected. From Table 7, all faculty users charged services against contract funds, as did 6 out of 7 other staff people. Thus, price appears to influence the class of user.

If this is true, then it becomes necessary to find funding mechanisms to pay, partially or completely, for searches by an undergraduate or any other potential user who lacks personal funds and has no recourse to grant monies. This area is currently being addressed at M.I.T. The problem is similar

to the one of providing funding for undergraduate use of computational facilities.

Is there any other discernible major influence of price? Price appears to influence the type of service users seek. To date we have had no use of offline services. A review of Table 2 readily shows that the offline services currently offered are more expensive to use than online services. The offline prices are for search periods of one-year of a data base. In the online mode, the cost is per connect-hour and it is possible to search several years of data base coverage at one time. The connect times in Table 9 show that the average online search is accomplished in well under one hour of terminal connect time. Terminal connect time would have to increase by an extraordinary percentage to exceed the cost of a comparable offline search. While we have not yet performed online current awareness searches, there is no question that the above argument on relative cost still remains valid. Our users have recognized these differences in relative cost and some of them have made explicit comments to that effect. But the issue is also confounded by questions of convenience. There is no question that online searches give the user faster results. The searching process is highly interactive. There is immediate feedback. The user obtains results as his search proceeds. There is no delay except for additional extensive printouts (the delay in mailing is only one-way because the search itself has already been performed). Thus, online services are not only lower in cost, they are also more convenient. It is worthwhile re-emphasizing at this point that NASIC represents services available on systems maintained by others whose costs are shared widely. The commonly held view in many quarters that online systems are more expensive than offline systems just does not carry over to the kinds of computer based reference services that NASIC activities represent.

Does price affect the way in which a data base is used? It appears from the data in Table 8 and the above discussion of that table, that the characteristics of searching a data base, at least in the appointment mode, are not influenced by price. Users do not search a data base for

a longer time simply because it costs less money. If they did, the average connect time for each data base should show a progressive increase with decreasing cost but it does not (cf. Table 2). It is much more likely that the size and comprehensiveness of the data base being searched influence the connection time. Indeed, the bigger the data base, the greater the connection time. INFORM is as expensive as CHEMCON, but it is the smallest and least comprehensive data base; it has the lowest connect time. The other side of the coin, namely the time the user spends with the Specialist in his appointment but not in an online connection, is not as amenable to interpretation. We suspect that this time, which is largely reviewing the problem and setting up an initial strategy, may be a function of the kind of indexing, the vocabulary controls, and the retrieval aids that are associated with each data base. Much more study is required in this area, particularly because it may turn out that other factors limit the total time available for both pre-search strategy plus on-line search, and that these limits, in turn, influence the proportional breakdown. Some factors that might influence the total time limit on pre-search plus search are psychological conditioning of Specialist and user to expect about one-hour, anxieties about exceeding an appointment block, and external boundary conditions such as having another commitment scheduled, perhaps because of prior expectations of appointment length.

Why hasn't there been greater use of computer-based services during this 2 1/2 month period? One might suspect that one reason was timing. Thanksgiving, fall semester finals, Christmas recess, the three-week Independent Activities Period in January, and a recess between IAP and the spring semester all fell within this period. However, business did not suddenly boom once the second semester began in early February. Three factors much more important than timing may provide the answer: (1) paying for services, (2) data bases of interest, and (3) marketing. Earlier, we said that price alone cannot explain which data bases are more frequently used. However, the fact that users are asked to pay for the services they receive, services that traditionally have been "free," may be a psychological, as well as an economic, barrier. Potential

users who come to NASIC have already overcome the barrier. Additional marketing will help others over the barrier. Once that barrier is overcome, the particular data bases of interest to a user will be searched, at least as long as their absolute cost is not unreasonable in terms of value received. The people who come to us want service. The relative cost of different bases may be less important to potential users than the acceptance of having to pay for service in the first place. At present, direct payment for information (copying services excepted) is new to most people. But administrators of information sources know all too well that their cost is a cost actually borne by users indirectly through institutional overhead or by taxes. We will not get into the question of whether the cost of all information services should be borne directly or whether some or most such services should continue to be paid for indirectly. But shortly we will address that question with respect to computer-based literature searches. First, let's consider whether there is a value to having these services. If there is none, cost would be moot.

Almost all of these computer-based services have a printed counterpart such as Chemical Abstracts for CHEMCON or CA-Condensates, Index Medicus for MEDLINE, Research in Education for ERIC. In fact, the machine readable data base is really a by-product of producing the printed form. What then are the values gained by working with the machine version that are present to a lesser degree or absent when working with the printed publication? The major values of a machine-based search are:

1. Less time required by a user to do a search, especially if the search is by subject.
2. Only one search need be performed for the cumulated years of coverage of the data base.
3. Physical manipulation of multiple volumes is avoided.
4. Complex logical combinations can be used that are difficult or impossible to carry out in manual mode.
5. Typically, the indexing and retrieval mechanisms go beyond those present in printed form so that there is greater accessibility to each item (the number of access points is increased).

6. Computer printout generally eliminates the need to take notes or copy citations.

Time saved and accessibility are the two most important. Unfortunately today in academic environments, people's time is less highly valued than say, in industry, but this is changing. There is greater emphasis on productivity in the office, laboratory and classroom and this will, in turn, influence research in the library. Accessibility to records is improved by deeper indexing and by machine techniques but it requires particular knowledge, understanding, and training to be used properly. Users of machine services, by so doing, can improve their skills in conducting searches in any medium and thus their use of the library in general can become more effective. This is very important because machine services are in no way a replacement of traditional services; each type of service complements the other.

We have no doubts about the value of machine-based services to users. Do users have doubts? Because of the small number of users so far, it might seem that potential users do. However, our initial actual users have been highly enthusiastic about the services they received; more on this later. What then is the problem? For one thing, it takes time for a new service to make itself known and to build up a consumer group. We began our operations with only four data bases. We need to make available a larger number of data bases of interest to more segments of the community. We are proceeding early in Phase 2 to train Specialists in working with additional data bases. In two years we expect to have about twelve to fifteen such data bases available.

But just making more data bases available will not in itself solve the problem. An improved marketing effort is essential in order to develop an initial thrust of interest in each new data base. Over the somewhat longer-range, word-of-mouth should become more and more effective as a source of new users. An initial core of satisfied users need to be obtained (while taking pains to see that initial service is of high quality and effective because it is much more difficult to overcome negative reactions.) The marketing effort to-date has relied on a number of devices, mainly that of written materials (letters and brochures) sent to potential users,

demonstrations, and news stories (refer to the lists under Task 7 on Marketing and Publicity). Table 6 shows that all publicity mechanisms yield some response in the M.I.T. community; in addition, a monthly breakdown of this data would show that word-of-mouth by satisfied users is gaining in predominance with time. Within the library, referral by library staff, displays, and demonstrations have been important avenues. Of 49 M.I.T. users, seven have been repeat customers (a form of self-referral and an ultimate test). But the publicity for reaching users who haven't come into the library generally has been passive. We personally know of several faculty and other staff members who received brochures by mail but who, when asked informally about the mailing, have little or no recollection of it. The mailings have gone unnoticed or unread by many recipients. This form of advertising, while having a definite role, is not sufficiently differentiable from all the other mail received by our potential users. A boost is needed to create awareness of NASIC among prime user groups. Personal contact and follow up is a necessity. However, this does not mean a hard sell which probably would not go over well in academia. It does mean a personal touch which can tune into specific needs of the potential user. New publicity mechanisms must relate more heavily to specific and current needs of potential users, such as in thesis work, contract preparation, or course development, to motivate them to become real users. In addition, it is important to emphasize more the values of a machine based search since these values are not necessarily obvious to users. In Phase 2 we plan to undertake a more active publicity campaign. This will include, among other techniques, meeting with faculty individually or in groups, phone-call follow-ups to mailings, and enlisting the aid of satisfied users. Libraries usually have not actively promoted their services. But for a new product such as computer-based searching to get off-the-ground and find acceptance within the community, active promotion is a necessity. It may even attract new users to other library services.

We know from the short-time that we have been on-the-air that there is a demand for the kind of services being offered. That there is some strength to this demand can be adduced from the fact that many users are paying out-of-pocket for such services, although the majority of users to

date have access to contract or grant monies. We also know that a greater number of data bases and a more personal marketing effort can be expected to improve the growth of service use. Given the value and the use, who should pay for services such as these? This is a question that each institution must, of course, answer for itself in terms of its own size, budget, and funding mechanisms. To take on an extremely simple and conservative calculation, suppose the expenses associated with a typical search including all direct and indirect costs for computer time, communications, direct-labor, administration, terminals, advertising, and materials, is $75. If a modest 500 searches can be expected in the course of a year, then $37500 is needed to cover expenses; for 1000 searches, $75000 is required. The reader can make multiplications for other demand rates but it should be obvious that a dollar level is required for complete subsidization of even moderate use that could be difficult for an organization to raise in today's economy on top of already seriously strained budgets especially where the cost-effective benefits may not be apparent for this new kind of service. True cost effective calculations will require looking at the user, and the time values of the user, as part of the service system. If a library cannot completely subsidize these services, then initially at least, it may be better to offer services at fees that recover most costs and by so doing, demonstrate to higher administrative levels that, even with a charge, there is an actual demand for these services. Simultaneously, other mechanisms can be sought to support all additional costs through rearrangement of budget priorities, through cost-sharing with departments, or through entirely new avenues. For example, M.I.T. is, at least currently as an introductory offer, subsidizing the time of the Information Specialist with all other costs charged to users. Many other ways to share the costs are possible, and there also are many ways to set up a pricing structure but it is not our purpose in this report to review them. It <u>is</u> our purpose to point out that a new service of value to users and in demand by them, is available and that it can be offered by a library, even if the user must be charged some, if not all, of the cost.

If a library chooses not to offer such services, other campus organiza-

tions such as individual departments or a computation facility probably will, and for a fee too. If a library relinquishes this kind of service, it would be, in our view, unfortunate and indeed a disservice to the campus and to the profession for the following reasons:

1. librarians represent the bibliographic expertise available to the community
2. these services are, in effect, a powerful catalog and index to materials available through the library
3. information needs of users require availability and integration of diverse resources, one complementing another
4. separation or isolation of these resources undermines the ability of any one resource to be used effectively
5. the end user suffers because different organizations can each satisfy only a part of his information needs.

Let's turn to other analyses that can be made at this time of the M.I.T. operation. Table 8 tells us that the average number of business days between the time a user arranges for and holds an appointment is 5.7. The median wait is only 3 business days; that is, half of the appointments are held within 3 days of the user's call. The average wait has been affected by several users who found it necessary to reschedule their initial appointments or who otherwise had full calendars and found it difficult to initially arrange an appointment for a time slot when the data base of interest was also up. The waiting time may seem excessive but no user has requested immediate service. It is possible, however, that we may not be hearing from users who want instant or demand service such as they get themselves by searching on their own manually in the library. Nevertheless, we suspect that there is a greater tolerance on the part of most users for waiting for service than is commonly thought. On the other hand, if the median wait approaches a week or more, this is likely to be excessive and beyond tolerance. The tolerance of users may be because they know they will obtain system feedback at the time of their appointment. In our initial operations, a user could receive service for any data base, except MEDLINE, in any divisional library. However, the time of the appointment rather than its

location may be more important to a majority of users, although several users have indeed requested service in a particular library. The issue of service facilities geographically convenient to the user is clouded by the SDC three-hour time windows during which only certain data bases are accessible. We hope to clarify the picture of user convenience during Phase 2. We also wish to experiment with providing service directly in the office or laboratory of a user. In addition to time and location of an appointment, some repeat users have specifically requested service with the same Information Specialist who served them earlier; this makes good sense particularly if the same user problem is to be searched against another data base. It also represents the beginning of a professional relationship between Specialist and user.

There is additional data to draw upon which will help to complete the picture of NASIC operations at M.I.T., particularly in terms of background functions and duties. For example, a user who either phones in to, or stops by, the Coordinator's Office spends from 5 to 20 minutes conversing with the Coordinator's Assistant about the services available, their cost, which one(s) are applicable to his problem, arranging an appointment, and the nature of the user problem statement. Two or three subsequent calls are often necessary, but these are generally much briefer, and the nature of these conversations mainly is to confirm an appointment, remind a user of an appointment, or request return of the problem statement.

The interaction that transpires is an essential, even influential, element in the marketing process. A potential user already has been motivated to make an inquiry. Some of these people are prepared to arrange an appointment, others need further reassurance that NASIC services will be helpful to them, and others cannot be served at the present time by the available data bases but may be candidate users of an expanded service. A file of prospective users and their interests is being kept.

The centralized mode for dispersing information and for appointment arrangements has been most beneficial in lessening the burden that otherwise might be carried by the Specialists and other personnel in each library. The Specialists can concentrate more on the actual service than on arrangements for service. In those cases when the first point of contact

of a prospective user with NASIC is within the library through a staff member or by seeing a display, the prospect is referred to the Coordinator's Office for more detailed information.

The Specialists spend about ten to fifteen minutes before an appointment reviewing the user problem statement to familiarize themselves with the problem. This may include consulting printed forms of a data base or associated thesauri and other retrieval aids. In several cases, the Specialists have also conducted online pre-appointment searches of about 10 to 15 minutes to test out vocabulary and strategies. These pre-appointment searches tend to be undertaken when the Specialist is less familiar with a specific subject area or its treatment in a data base and this may be considered part of the learning process. We expect that this type of activity will decrease as the Specialists continue to gain experience in providing these services. A natural question to ask is what effect a pre-appointment search has had on the effectiveness of the actual search during the appointment, but we have not yet looked into this, either quantitatively or qualitatively.

After an appointment, a Specialist may spend up to an additional half hour documenting the major events transpiring during the appointment. These "minutes of the session," so to speak, are an important tool for any later analysis of the sessions, the problems (technical or logical), and the reactions. If a user does not wish to keep the print record of his search (a rare occurrence), then these are made part of the documentation. In the absence of that record, the Specialist generally notes the strategy that has been used. These can be most helpful later for training new Specialists, for demonstrations, and for referral from a similar problem by another user.

The total pre-appointment plus post-appointment activity of a Specialist may be, on average, about an hour or almost as long as the average appointment itself. Some of the pre-appointment time is a result of inexperience. A good portion of the post-appointment is a direct result of the experimental mode in which M.I.T. is studying and testing these kinds of services for NASIC.

None of the costs associated with the Specialist's pre-appointment or

post-appointment activities are charged directly to users. The pricing structure, which was described in Task 6D, included within the derivation of the hourly rate for the Information Specialist, about 10 minutes for pre-session plus post-session activity. Even with allowances for inexperience or for testing activities, the 10 minute estimate is too low. A better estimate of steady-state, non-testing, activities occurring either before or after an appointment is probably 20 to 30 minutes. Thus, the hourly rate charged for a Specialist's time should be higher for operational cost recovery. In addition, if it becomes clear that there is a normal role for pre-appointment searches, then the cost for this computer activity will also need to be included within the pricing structure, either by adding that connect time to the appointment connect time, or by increasing the administrative surcharge within the computer search component of the pricing structure. We expect to look into this area more closely in Phase 2.

In addition, there are interactions which transpire between the Coordinator's Office and the Specialists. Each interaction is generally brief but the number is, in part, a function of the volume, and their aggregate represents Specialist time yet to be accounted for in the pricing structure for true cost recovery.

Another element of interaction is a weekly two-hour meeting of the Specialists with the Coordinator and with Laboratory staff to review the operational activities and associated problems, to discuss further development and testing and to continue training. In a steady-state operation, this activity should be less frequent. However, periodic review meetings between Specialists and Coordinator represent an activity that should also be accounted for in a revised pricing structure.

The initial pricing structure was also based on operations requiring a Coordinator estimated at 20 percent full-time and an Assistant to the Coordinator estimated at 60 percent full-time (cf.Task 6D). Our experience indicates that the duties performed by the Assistant reflect, in actuality, a full-time position. The Coordinator position is less clear but experience indicates that in a steady-state operation (with little or no development and experimentation) it is at least 70 percent, perhaps higher, for

coordination-related duties. These duties include, but are not limited to: marketing and publicity; relations with users, Specialists, library staff and administration, NASIC at NEBHE, and the profession; review and dissemination of updated information to Specialists. The remainder of the Coordinator's time can be devoted to performing Information Specialist functions. Thus, the time assumptions underlying the administrative surcharge in the pricing structure need to be revised in light of our initial experience in order to recover costs.

Price stability is a matter of some concern. The advantages to planning and marketing of a relatively stable price schedule should be obvious. At M.I.T., the price structure reflects elements of expense. When the expense rates change, it is in keeping with cost recovery to eventually pass along these changes in the cost to the user. When to pass along the cost is another matter. For those expenses under M.I.T. control, such as administrative expenses or Specialist charges, a periodic review using historical data for the past period can be implemented. An annual review, perhaps coincident with the end of the academic year, is probably sufficient. Other expenses not under M.I.T. control, such as computer or communication expenses, present difficulties because (1) they represent the bulk of user charges, (2) they typically are subject to change on 30 day written notice, and (3) these expenses reflect a direct outflow of funds from M.I.T. (or any other institution). Because of the size and nature of this expense, it is one that should be passed on to users as of the date the new expense rate becomes effective. However, a short advance notice period from suppliers is insufficient time to prepare, produce, announce, and disseminate new price lists to users in advance of the change date. The effects of a short notice on marketing are unwelcome. In an academic market, a stable period of at least a semester is highly desirable although a full year is even more preferable. NASIC/Central at NEBHE, on behalf of the institutions it represents, needs to negotiate with systems for a period of advance notice of price changes that would encourage price stability within academic calendar time frames.

The remarks in the paragraph above on price stability are based upon experience with a month notice by SDC of a price change (it was their first

change in over a year) for the connect hour rates of some data bases and on a change in the basis of printout costs (from a per-page cost to a per-citation cost). By way of contrast, Georgia issues a price list effective for a 12 month period and will honor current rates for specific continuing searches that extend beyond the price-year. On 1 February 1974 we did change our price rates to reflect the SDC changes. During the few weeks preceding the change, inquirers were verbally told about the forthcoming change. They were even told that if they made an appointment before 1 February, it would cost them less. There was no discernible effect of the price change on either data base usage or on printout requests. This is probably because we were still too new for many potential users to have been fully aware of the service, let alone the older rates.

The reader may be interested in the revenues that were generated in the two and a half month period since operations began. Table 9 summarizes the revenue by major categories for computer and administrative charges, Information Specialist charges, printout charges, and other charges. Associated with these categories are allowances against the charges to users for problems, technical and non-technical, that arose during an appointment. The largest allowance category is for the time of the Information Specialist since most users are eligible for the introductory credit. After all allowances, the total net revenue generated for this initial period is $1095.05 for BASIC services and $494.08 for MEDLINE services. In phase 2, we expect to be able to relate revenue to expenses.

Appendix B contains most of the forms that we have been using during our initial operations. These forms were described under Task 6F. A few of the forms have undergone modification since they were implemented and some still need to be revised but none of the changes are major. One initial form for an inquiry follow-up has since been eliminated because common techniques such as standard pads or quick notes or phone calls are more viable. The forms are used at different times by different people and for different functions. Sometimes the information entered onto the forms is less than complete but for the most part, everyone recognizes

Table 9

NASIC AT MIT

REVENUE SUMMARY DATA

15 NOVEMBER 1973 TO 28 FEBRUARY 1974

REVENUE SUMMARY:	NASIC		MEDLINE	
COMPUTER AND ADMINISTRATIVE CHARGES	$989.02		$388.30	
LESS: MACHINE CONNECTION PROBLEM ALLOWANCE:	(23.76)		(11.70)	
NET COMPUTER AND ADMINISTRATIVE CHARGES		$965.26		$376.60
INFORMATION SPECIALIST CHARGES:	$267.62		$261.14	
LESS: INTRODUCTORY CREDIT:	(220.55)		(239.56)	
LESS: OTHER SPECIALIST TIME ALLOWANCES:	(12.00)		(--)	
NET SPECIALIST TIME CHARGES:		$ 35.07		$ 21.58
PRINTOUT CHARGES:		$ 94.72		$ 98.70
OTHER CHARGES:	--		--	
LESS: OTHER ALLOWANCES:	(--)		(2.80)	
NET OTHER CHARGES:		--		($ 2.80)
TOTAL NET REVENUE		$1095.05		$494.08

the importance of the documentation and its role in characterizing, analyzing, and understanding the service operations and using this information as a basis for further experimentation, testing, or improvement.

When the problem statement that users are asked to fill out was drawn up, we had misgivings about its length. Our fear has proven to be unfounded. User receptivity of the statement has been gratifying. The statement has been particularly beneficial to the Specialist in being able to talk with the user in his own terms. The statement is also beneficial to the user in getting him to think more about his own problem and its boundary conditions in advance of the search so that the Specialist and user can optimize their interaction. In one instance, a potential user was attempting to provide a narrative of his problem but as a result he realized that he did not understand his problem. He stated that to go ahead with a search at that time would be a waste of his own time and money but that he would do a search after he thought more about what he was after. This phenomenon is not new to reference librarians but when users pay directly for services, then knowing what you are doing takes on added importance. Users are told that the efficiency of their appointment can be increased and that the cost of services to them can perhaps be lessened if the statement is filled out prior to their appointment. Users have filled out the statements in varying degrees of completeness depending upon just how much information they already have at their command. Only two users have raised any objection to the statement, and this only because of misunderstanding its purpose. If a user does not fill out the statement, and he is not required to, the necessary information is still gathered by the Specialist during a more extensive reference interview at the time of the appointment.

Interactive retrieval systems are dynamic and change with modifications over time. There are occasional operational difficulties, both technical hardware and logical software problems, and there are also data base content problems. Many problems make themselves known at the interface between searcher and system. Some difficulties are not so much a problem as they are a system procedure in need of either improvement, or further exposition. We have been in frequent contact with the SDC Search Service Staff in order to resolve whatever issues arise with respect to

ORBIT and the available data bases. It is a pleasure to note that the SDC staff has always been attentive, responsive, and most cordial to our inquiries. We have had occasion to offer a number of suggestions to SDC on improvements to their system. While we make no claim to either the originality or uniqueness of such suggestions we do note that SDC has acted on many of them. This is highly indicative of the kind of results that a central NASIC organization could help bring about even more effectively because it would represent a large user group. For items in need of clarification, a central NASIC organization could effectively disseminate responses and examples or solutions that are more extensive than the information typically appearing in retrieval system newsletters. We are already doing this kind of dissemination at M.I.T. from the Laboratory to the Coordinator's Office to the Specialists. There is a continuing need to generate materials that supplement the information available directly from a retrieval system.

The user receptivity of NASIC services is of considerable interest but we can give only an informal report at this time. In Phase 2, we will undertake a more formal survey of users (and non-users as well) to obtain personal reactions and to have a basis for changes to the operation. We have, however, received enough informal and unsolicited remarks by users to know that they do like and respond positively to the in depth, customized service and personal attention given to their bibliographic needs.

One of our earliest users ran three searches, one on CHEMCON and two on MEDLINE, to complete his background research. He said he was satisfied, that he had obtained very relevant information, and that peripheral material that at first did not seem pertinent had been found to be useful to other members of his research group.

A CHEMCON user, an older man and a faculty member, had been a frequent user of Chemical Abstracts in printed form. He related that he had been extremely pleased with his search results and he also said, "Frankly, I'm just getting too old to wade through all that stuff--I'd rather let the machine do it--it's really something." His particular search came to $57 and he said it was worth every cent.

Much of the user response is seen at the Coordinator's Office when

people stop by to pick up their off-line printouts. They usually take a few minutes to review it and have universally seemed pleased with their results.

A graduate student from Harvard stopped by for the printouts from combined ERIC and MEDLINE searches on information gathering by eye movements. She said, "I could do this every day." The results were to be shared with her research group who were working on a proposal. Her search is also indicative of the multidisciplinary nature of many search problems. In this case, the topic was approached from both its physiological aspects and its psychological or reading aspects.

Our initial efforts in integrating computerized reference service with traditional service can also be illustrated. We saw earlier from Table 6 that a number of users have been referred to NASIC by the library reference staff. In turn, NASIC users are also referred to traditional sources by the Specialists who look to see how the user can best be served. A student who made an appointment to use INFORM opted for a traditional search after the Specialist told him of several printed indexes which were more relevant for his particular problem than the machine stored data base he had chosen. Another user, an administrative officer, who did search INFORM was also told by the Specialist of two printed materials of which he was previously unaware, one of the printed items being Business Periodicals Index. This individual not only also used the printed sources, but he has also returned to do a further search both by computer and in printed sources.

Thus, NASIC and traditional library services are complementing one another. The emphasis is on understanding and solving the user's problem using the most appropriate sources and thereby gaining the fullest utility of information resources regardless of format or media.

Analysis for Future NASIC Systems (Task 13)

M.I.T. staff have held a discussion with staff members from QEI Inc. who were performing a study of evaluative procedures that will be useful for NASIC. This discussion included consideration of criteria for computer systems. QEI recommendations may be found in a separate report submitted by QEI to NEBHE.

M.I.T., NERCOMP (New England Regional Computing Program), and NEBHE staff have met to discuss potential models of NASIC operations. In the area of NASIC services, these include a batch model, a batch model with remote job entry input and/or remote printer output, and an on-line model. Communications models between a NASIC Information Specialist and the user include personal contact, voice phone, Telex-like connections, mail, and lastly, direct communication between user and supplier with NASIC acting only as comptroller. The consensus at this time is that there should not be any dedicated NASIC computer, that NASIC should not build a network parallel to existing regional networks, but that NASIC should consider using existing computing facilities in the region , and that the ability to provide on-line services may be the primary future mode of operation. Model definition will be refined in Phase 2 as additional information about existing facilities in the region and on actual experience with the M.I.T. pilot operations is gathered.

Plans (Task 14)

The discussion under many of the preceding tasks has indicated areas in need of further study, development, or testing. A formal plan for work on NASIC at M.I.T. during Phase 2 has been submitted to the New England Board of Higher Education.

Appendix A. Project Personnel

Electronic Systems Laboratory

Professor J. Francis Reintjes
Mr. Alan R. Benenfeld
Mr. Richard S. Marcus
Mr. Jorge R. Peschiera

The MIT Libraries

Miss Natalie N. Nicholson
Ms. Marjorie Chryssostomidis
Mr. Edgar W. Davy
Ms. Margaret E. DePopolo
Mr. William J. Duggan
Mrs. Patrica T. Gordon
Ms. Irma Y. Johnson
Mr. James M. Kyed
Ms. Ann S. Longfellow
Ms. Margaret A. Otto
Ms. Mary E. Pensyl
Mr. Phillip W. Piper
Mr. Peter R. Scott
Mrs. Jacqueline Stymfal
Mrs. Frances B. B. Sumner
Ms. Nancy G. Vaupel
Ms. Susan E. Woodford

Information Processing Services

Mr. Robert H. Scott

Appendix B. Sample Forms Used in Operations

Copies of the following forms are included:

Figure B1. Initial Service Schedule for Appointments

Figure B2. Inquiry Data - General

Figure B3. Inquiry Data - Description

Figure B4. Inquiry Data - Special Questions

Figure B5. Inquiry Post Card

Figure B6. Appointment Reminder

Figure B7. User Problem Statement (3 pages)

Figure B8. Work Order

Figure B9. Appointment Log and Review Analysis

Figure B10. Information Specialist Weekly Time Allocation Sheet

Figure B11. Information Specialist On-Line Connection Log

Figure B12. Rate Sheet (illustrating M.I.T. charge per minute for online connection using CA Condensates)

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	ON-LINE DATA BASES
9-10:30 or 9:30-11	ANN SUSAN (MED)		PAT (mad) *NANCY	ANN SUSAN (MED) *JACKIE	JACKIE NANCY	BUSINESS — INFORM EDUCATION — ERIC MEDICINE — MEDLINE
11-12:30	SUSAN (mad) *ANN	NANCY ANN	NANCY *PAT	JACKIE NANCY *ANN	SUSAN (mad) *NANCY	CHEMISTRY — CHEMCON BUSINESS — INFORM MEDICINE — MEDLINE
12:30-2	PAT (mad) MARJ	PAT (mad) *SUSAN	SUSAN (mad) MARJ	PAT (MED) MARJ	PAT (MED) ANN *MARJ	CHEMISTRY — CHEMCON BUSINESS — INFORM MEDICINE — MEDLINE
2-3:30	PAT (MED) JACKIE *MARJ	SUSAN (mad) JACKIE *PAT	PAT (MED) JACKIE *ANN		PAT (mad) MARJ *SUSAN	BUSINESS — INFORM EDUCATION — ERIC MEDICINE — MEDLINE
3:30-5	NANCY *JACKIE	SUSAN (MED) MARJ *JACKIE	SUSAN (MED) ANN			BUSINESS — INFORM EDUCATION — ERIC MEDICINE — MEDLINE

*OFFLINE APPTS. ONLY.

(MED) MEDLINE PREP.

(mad) MEDLINE BECOMES 2ND CHOICE.

Fig. B1 Initial Service Schedule for Appointments

N A S I C A T M I T

Page 1 of ____

INQUIRY DATA - GENERAL

Receiver:_____ In-Person Phone Mail Date:_____ Time:_____

Location: CO BE D H R S Other_____ Duration:_____

Repeat Caller: Y N Repeat User: Y N Agency Call:_____

CALLER: Name:_____

Address:_____

_____

Phone and Hours:_____

Alternate Address/Phone:_____

Dept. or Lab. or Course:_____

Status: MIT Non-MIT Affil:_____ (ILO P A)

Faculty DSR Staff Library Graduate Student (D M) (TA RA)

Post-Doc. Admin. Staff Undergraduate (1 2 3 4 5)

Other Position:_____

Is Inquiry for Someone Else?_____

_____

_____

FOR NCO USE ONLY: Appt. for:_____

Appointment: Day:_____ Time:_____ Specialist:_____

Location: CO BE D H R S Other_____

Special Set-Ups:_____

Consultation to Discuss Services Available: General For Specific Problem

Expected Search Services: Retrospective On-Line Data Base(s)_____

SDI Off-Line System(s)_____

TBD TBD TBD

Other Services:_____

_____

Expected Payment Method: MIT Charge (Acct._____) Check Cash Non-MIT P.O.

Other (including experimental):_____

Brief Problem Title:_____

_____

_____

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Fig. B2 Inquiry Data - General

Page____ of_____

N A S I C A T M I T

INQUIRY DATA - DESCRIPTION

Caller:_____ Date:_____

Codes	Follow Up	Description (Include summary, problems, actions required, comments)

1. General
2. Brochures/Publ.
3. Data Bases/Retr. Syst.
4. Searching
5. Pricing
6. Specialists
7. Terminals
8. Outputs
9. Output Recvd.
10. Delivery Services
11. Service Hours/Locations
12. About Appts.
13. User Funds
14. Requisitions
15. User Worksheets
16. Work Order
17. Order
18. Change Order
19. Cancel Service
20. Billing
21. Credits
22. Payments
23. Connection Problems
24. Searching Problems
25. Equipment Problems
26. Experiments
27. Comments
28. Complaints
29. Arrange Appt.
30. Change Appt.
31. Cancel Appt.
32. Appt. Reminder
33. Appt. Scheduling Problem
34. Schedule Change
50. User Topic
80. NEBHE
81. Outside Agency
99. Other

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Fig. B3 Inquiry Data - Description

Page ____ of ____

N A S I C A T M I T

INQUIRY DATA - SPECIAL QUESTIONS

Caller:_____ Date:_____

1. Several methods of announcing NASIC have been used. How did you specifically learn of NASIC?

_____ Brochure	_____ Tech Talk	_____ Library Bulletin
_____ Letter	_____ Poster	_____ Saw a Site
_____ Colleague	_____ Meeting	_____ Saw a Session

Other _____

2 - 4. If no appointment has been made, and if it is not obvious from previous data:

2. Can you tell us the reason you do not wish to arrange for an appointment at this time? Your answer may help us improve upon our services.

3. What is the subject area of interest to you?

4. Do you have access to an MIT charge account?
(If yes) Who would need to approve a requisition against that account?
(If no) Are other funding sources available to you?

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Fig. B4 Inquiry Data - Special Questions

Room 10-400 NASIC AT MIT 253-7746

Request for Information

Brochures about NASIC search services are available at the reference desk at each MIT library. For further information about NASIC services, kindly phone 253-7746 or stop by the central NASIC Coordination Office, Room 10-400, between 9 and 5, Monday thru Friday. If you prefer, let us know when and where we may contact you. Please leave this card with a Library staff member or put it into the Institute mail. Thank you.

Mary Pensyl, NASIC Coordinator

Name:

Address:

Phone(s):

Hours You May Be Reached:

Nature of Inquiry:

TO: MARY PENSYL
NASIC COORDINATION OFFICE
ROOM 10-400
M.I.T.

Fig. B5 Inquiry Post Card

MASSACHUSETTS INSTITUTE OF TECHNOLOGY CAMBRIDGE, MASSACHUSETTS 02139

Room 10-400 MIT LIBRARIES 253-7746

N A S I C A T M I T

APPOINTMENT REMINDER

To: Date:

You have an appointment
with
at
on
at

Please be prompt. If you are charging NASIC services to an MIT account be sure to bring an authorized requisition slip with you. If you must change your appointment, please call the NASIC Coordinator's Office, 253-7746.

You can help increase the efficiency of your appointment with the Information Specialist and perhaps lower the cost of services to you by carefully filling in the attached User Problem Statement before your appointment. An initial search strategy will be developed by the Specialist together with you and it will be based upon your replies. The initial strategy may be modified by you and the Specialist as search results are received and reviewed. Kindly present these forms to the Information Specialist at the start of your appointment.

Thank you.

Mary Pensyl

Mary Pensyl
NASIC Coordinator

Fig. B6 Appointment Reminder

Page 1

N A S I C A T M I T

W.O.N._____

USER PROBLEM STATEMENT

Name:_____ Appt. Date: _____

Completing this form prior to your appointment will increase the efficiency of NASIC service during your appointment and will likely lower the cost of service to you.

1. Please give in your own words a narrative description of the problem to be searched. Be specific. Define phrases with special meaning. Cover all aspects of the problem but please underline particular phrases that are more important to you. Append a list to your narrative of any synonyms, closely-related phrases, and alternate spellings. Please indicate if any words or phrases have a special use that you wish to exclude. Use scientific and technical as well as common vocabulary.

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Fig. B7 User Problem Statement

User Problem Statement contd. Page 2.

W.O.N._____

Name:_____

2. Unless already stated, please indicate any models, end uses, or applications of your problem that could be helpful in retrieving useful references.

3. Please state any topics related to (or applications of, or views of, or approaches to) your specific problem that are not of interest if you wish to exclude retrieving references to any documents on such topics.

4. Please give a title to your problem.

5. Please list two or three of the most important authors (and/or organizations) publishing on your topic. Complete names are helpful. Please indicate if you wish to exclude documents by any of these (or other) authors or organizations because of prior familiarity with their publications.

6. Please list two or three of the most important journals covering your problem. Please indicate if you wish to retrieve references to documents from only these journals. Please indicate if you wish not to retrieve references to documents from any particular journal, perhaps because you personally receive the journal.

7. Do you wish either to retrieve or not retrieve references to documents written in a particular language? _____Does not matter _____Retrieve English only
Retrieve only in_____. Do not retrieve in_____.

8. Do you wish to exclude references to particular types of documents?
Exclude _____Journal articles _____Books _____Patents _____Reports
_____Conference Papers _____Dissertations

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Fig. B7 continued.

User Problem Statement contd. Page 3.

Name:_____ W.O.N._____

9. Please list the complete citations to two or three of the most useful articles on your search topic. (It may be helpful to bring these articles with you to your appointment.)

_____

_____

_____

_____

_____

_____

10. Would you prefer

_____ a comprehensive search that retrieves most of the references relevant to your problem, but which may also retrieve many references not relevant to your problem?

_____ a narrow search that may retrieve fewer references relevant to your problem, but which also retrieves fewer non-relevant references?

11. Can you estimate the number of relevant documents

a) you think may be present in the literature _____

b) you would like to retrieve and get references for _____

12. If you have previously done a literature search (manually or by computer) on this problem or a closely related problem, please indicate if possible what was searched, what difficulties were encountered, and the overall result of the search.

_____

_____

_____

_____

_____

_____

_____

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Fig. B7 continued.

N A S I C A T M I T
WORK ORDER - PART 1 - SUMMARY

Specialist _____ Service Date _____
Work Order No. _____ NASIC Account _____

Name _____
Address _____
_____
Phone _____

Bill To (if different) _____
_____
_____

☐ MIT Requisition No. _____ Dated _____ User Account No. _____.788 (NASIC)
☐ Purchase Order No. _____ Dated _____ _____.789 (MED)
☐ Cash Receipt No. _____ Dated _____ Amount Paid $* _____ Account 11305.155
☐ Check ID _____ Amount Paid $_____ Account 11305.155
MIT Personal Charge ☐ Employee ☐ Student MIT ID _____

SERVICES (*Minimum Charge applies): ▨ Industrial Rates Apply ☐	Service Rate	Units Used	Cost	Object Code
*Retrospective Searches (System, Data Base, Offline Coverage)				
*Partial Volume Retro. Search (System, Data Base, No. Issues)				
Current Awareness (System, Data Base, Issues)				
*Specialist Services (Description, Time) Specialist Appointment Time				159
Output Costs (Describe) Off-Line Printouts				161
*Document Services (Describe)				
Other Services (Describe)				
Consultation About Services (No Charge)				
	SUBTOTAL			—
Credits Deducted (Describe) Specialist Time			( )	163
Computer Problem Allowance			( )	173
Other Allowance			( )	179
	CREDITS SUBTOTAL			—
	TOTAL CHARGE			
	Charges Prepaid			
	Balance Due			

Supplementary Services to be Billed Later:
☐ Printout ☐ Delivery ☐ _____ Initials ____

☐ Prepayment of $_____ exceeds Total Charge. REFUND of $_____ is due user

Thank you for using NASIC AT MIT. Call 253-7746 should you have further questions.

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Fig. B8 Work Order

Page ____ of ____

N A S I C A T M I T

APPOINTMENT LOG AND REVIEW ANALYSIS

Specialist:_____ Date:_____

User:_____ Work Order:_____

Please record running notes of problems and important decisions during an appointment. Later, complete the notes with a more detailed commentary and analysis. In particular, note (1) technical problems with connections or terminals (e.g. nature, time, duration, attempts to solve); (2) search software problems (e.g. nature, solutions); (3) search strategy and performance problems (e.g. nature, development, effectiveness); (4) user interface behavior; (5) user commentary. For connection and software problems, attach if possible the relevant sections of printout.

Technical Problem		Notes, Descriptions, Commentary, Analyses
Time	Duration	

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Fig. B9 Appointment Log and Review Analysis

Specialist _____

INFORMATION SPECIALIST TIME ALLOCATION SHEET

Week Ending _____

ACTIVITY	NASIC SERVICES							MEDLINE SERVICES						
	WKND	M	T	W	T	F	TOTAL	WKND	M	T	W	T	F	TOTAL
Training and Practice 1. Meetings														
2. Offline Search Preparation														
3. Online Search Sessions														
Operations and Services 4. Meetings														
5. Offline Preparation														
6. Online Preparation														
7. Appointments Not At Terminal														
8. Appointments At Terminal														
9. Delegated Online Searches														
10. Coord. Office Interactions														
General 11. Study														
12. Documentation														
13. Travel														
14. Other														
TOTAL EXPENDED TIME														
15. Extra-Curricular Time														
CHARGEABLE TOTAL														
Terminal Connect Time 16. Training and Practice														
17. Operations and Services														
CONNECT TIME TOTAL														

Fig. B10 Information Specialist Weekly Time Allocation Sheet

ON-LINE CONNECTION LOG

INFORMATION SPECIALIST_____ MONTH_____197___

Date	User Name or Train or Demo	System	Data Base	Account (add holder if nec.)	Actual Connect Time (minutes)	Offline Citations	Ind. Rate	Connection Problem	Connect Allowance (minutes)

Fig. B11 Information Specialist On-Line Connection Log

CA/CONDENSATES

ACADEMIC RATES PER MINUTE

HOURLY RATE: $ 67

MIN	CHARGE	MIN	CHARGE
1	$ 1.12	51	$ 56.95
2	2.23	52	58.07
3	3.35	53	59.18
4	4.47	54	60.30
5	5.58	55	61.42
6	6.70	56	62.53
7	7.82	57	63.65
8	8.93	58	64.77
9	10.05	59	65.88
10	11.17	60	67.00
11	12.28	61	68.12
12	13.40	62	69.23
13	14.52	63	70.35
14	15.63	64	71.47
15	16.75	65	72.58
16	17.87	66	73.70
17	18.98	67	74.82
18	20.10	68	75.93
19	21.22	69	77.05
20	22.33	70	78.17
21	23.45	71	79.28
22	24.57	72	80.40
23	25.68	73	81.52
24	26.80	74	82.63
25	27.92	75	83.75
26	29.03	76	84.87
27	30.15	77	85.98
28	31.27	78	87.10
29	32.38	79	88.22
30	33.50	80	89.33
31	34.62	81	90.45
32	35.73	82	91.57
33	36.85	83	92.68
34	37.97	84	93.80
35	39.08	85	94.92
36	40.20	86	96.03
37	41.32	87	97.15
38	42.43	88	98.27
39	43.55	89	99.38
40	44.67	90	100.50
41	45.78	91	101.62
42	46.90	92	102.73
43	48.02	93	103.85
44	49.13	94	104.97
45	50.25	95	106.08
46	51.37	96	107.20
47	52.48	97	108.32
48	53.60	98	109.43
49	54.72	99	110.55
50	55.83	100	111.67

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CA/CONDENSATES

COMMERCIAL RATES PER MINUTE

HOURLY RATE: $ 82

MIN	CHARGE	MIN	CHARGE
1	$ 1.37	51	$ 69.70
2	2.73	52	71.07
3	4.10	53	72.43
4	5.47	54	73.80
5	6.83	55	75.17
6	8.20	56	76.53
7	9.57	57	77.90
8	10.93	58	79.27
9	12.30	59	80.63
10	13.67	60	82.00
11	15.03	61	83.37
12	16.40	62	84.73
13	17.77	63	86.10
14	19.13	64	87.47
15	20.50	65	88.83
16	21.87	66	90.20
17	23.23	67	91.57
18	24.60	68	92.93
19	25.97	69	94.30
20	27.33	70	95.67
21	28.70	71	97.03
22	30.07	72	98.40
23	31.43	73	99.77
24	32.80	74	101.13
25	34.17	75	102.50
26	35.53	76	103.87
27	36.90	77	105.23
28	38.27	78	106.60
29	39.63	79	107.97
30	41.00	80	109.33
31	42.37	81	110.70
32	43.73	82	112.07
33	45.10	83	113.43
34	46.47	84	114.80
35	47.83	85	116.17
36	49.20	86	117.53
37	50.57	87	118.90
38	51.93	88	120.27
39	53.30	89	121.63
40	54.67	90	123.00
41	56.03	91	124.37
42	57.40	92	125.73
43	58.77	93	127.10
44	60.13	94	128.47
45	61.50	95	129.83
46	62.87	96	131.20
47	64.23	97	132.57
48	65.60	98	133.93
49	66.97	99	135.30
50	68.33	100	136.67

Fig. B12 Rate Sheet (illustrating MIT charge per minute for on-line connection using CA Condensates)

Appendix C. Sample Publicity Brochures

Copies of the following brochures are included:

Figure C1. NASIC at MIT - General Brochure

Figure C2. NASIC/CA CONDENSATES - Services for chemistry and chemical engineering

Figure C3. NASIC/ERIC - Services for education, linguistics and information science

Figure C4. NASIC/INFORM - Services for business management

Figure C5. MEDLINE

NASIC* AT MIT

Automated Bibliographical Services For Research

NEW MIT SERVICE

A new service of the MIT Libraries will be available under the auspices of NASIC, on a fee-for-service basis, at five divisional libraries:

Science — Dewey
Humanities — Rotch
Barker Engineering

Monday through Friday, on an appointment basis beginning November 15, 1973.

The NASIC service will open on an experimental basis and provide access to data bases in the following fields:

Chemistry & Chemical Engineering
Education, Linguistics, Information Sciences
Business, Management, Economics, Marketing
Medicine, Biology & Related Sciences

Both on-line and off-line access to the several data bases will be offered. An on-line search can produce a printed list of references that you can take with you. Full bibliographies can also be printed off-line and sent by mail. In some fields you can also be alerted to new publications as they appear, on a regular basis.

An Information Specialist will be available at each location to explain the system and to show you how to find recent publications relevant to your research interest.

For information about types of services available and associated costs, and to arrange for an appointment with an Information Specialist, contact the NASIC Coordinator's office:

253-7746

Room 10-400

*Northeast Academic Science Information Center

A Program of the New England Board of Higher Education, NASIC is supported by the National Science Foundation under Grant No. GN37296.

DATA BASES AVAILABLE

Data bases for the fields listed below are ready now.

Chemistry & Chemical Engineering

CHEMCON, for Chemical Abstracts Condensates, derives from Chemical Abstracts, sponsored by the American Chemical Society, and has the same coverage: about 6,000 articles selected from 10,000 journals are added each week. The on-line file goes back to 1970, the off-line file to 1968.

Education, Linguistics, Information Sciences

The ERIC (Educational Resources Information Center) data base is maintained by the U.S. Office of Education. Each month about 1,000 new reports and 1,500 new journal articles selected from over 500 journals are added to the on-line and off-line files, which go back to 1966.

Business, Management, Economics, Marketing

The INFORM data base produced by ABI, Inc., is updated monthly at a rate of about 900 articles selected from 280 journals for this on-line file, which goes back to August 1971.

Medicine, Biology & Related Sciences

MEDLINE, operated by the National Library of Medicine, indexes the 1,200 leading journals in the biomedical field since 1970. It covers about 60% of the material in Index Medicus, with about 12,000 articles being added each month to this on-line file.

The complete NASIC information service now being planned will eventually include data for all major fields of research interest at MIT. New data bases will be added within the next few months to cover interests in government research, engineering and physics. All these data bases will be available through the NASIC regional network except MEDLINE, which is available on-line by separate arrangement with the National Library of Medicine.

(1) (2)

Fig. C1 NASIC at MIT - General Brochure

KINDS OF SERVICE

Two broad classes of service are being offered: retrospective searching of data bases, and a current awareness (alerting) service. All data bases can be searched on-line, and either immediate on-line printouts or delayed off-line printouts are possible. Most data bases can also be searched in an off-line mode.

The on-line search mode enables the operator to converse directly with the computer and to obtain an immediate response to a query in the form of a printed list of citations. This interactive feature makes it possible to use the system in an exploratory way to improve the effectiveness of the search. The operator can modify the search words and adjust the strategy as the search progresses in order to achieve a closer match with the needs of the researcher. This exploratory capability with the aim of refining the definition of the bibliographic problem is one of the most important features of the system.

If the list of citations is long and the need is not immediate an additional option permits printing off-line and delivery by mail, at substantial savings.

Also available for some data bases is an off-line retrospective search service. This option may result in lower cost for extensive search and printout requirements.

A current awareness service option that will alert you at regular intervals to new publications in your field is available for several of the data bases.

Search magnitude can be limited in various ways to a partial data base and by time, author, institution and other requirements.

USER ASSISTANCE

The assistance provided by the Information Specialist is an essential part of the new service. Each of the information retrieval systems has its peculiar special language, logic, rules of access, procedures, policies, kind of information and form of printout. The Information Specialist is familiar with all of the available data bases. This knowledge will be particularly valuable in formulating search strategies, interacting with the system and dealing with interdisciplinary information requests.

The primary task of the Information Specialist is to assist you in translating your problem statement into the language of the system in order to help you to maximize the satisfaction you derive from the system and to minimize the cost of making a search. This user interaction may take half an hour or more to develop an appropriate search strategy.

(3)

SPONSORSHIP

The NASIC computer-based bibliographic service is being developed by the New England Board of Higher Education under a grant from the National Science Foundation. The experimental MIT service is being tested by the MIT Libraries and Electronic Systems Laboratory under a contract with NASIC. The experimental service at MIT will become the first node of a regional network of science information centers located at university libraries in the northeast region. Policies and procedures for the NASIC network will be based on experience gained at MIT during this experimental period.

The MEDLINE system for the biomedical sciences is not a part of the NASIC service, but is made available at the same terminals at MIT by arrangement with the National Library of Medicine.

COST

Although development costs are being underwritten by NSF, operating costs must be recovered on a fee-for-service basis. Fees vary with the amount of service provided by the Information Specialist, the data base searched and the time spent at the terminal.

Since MEDLINE is substantially subsidized by the National Library of Medicine, the cost of searching this data base is less than search costs for the others.

The price structure includes a fee for the Specialist's time spent in developing search strategies with you and for operating the system. Because time spent at the terminal is expensive, users can generally minimize overall costs by taking advantage of the skills of the Information Specialist. There is a charge of $8.00/hour of Specialist's time with a minimum charge of $5.00.(A)

Further details of fees are included in separate brochures that describe each data base. Typical examples of computer search costs are: for a half hour of time spent at the terminal searching the business data base INFORM -- $33.50, for a similar search of MEDLINE -- $9.00, for ERIC -- $22.00, for CHEMCON -- $27.50. Times and prices may be lower for simple problems or higher for more complex problems or those that have not been well defined intially by the user. An off-line search of a one year collection of ERIC would be $76.00. A Current Awareness subscription service for the Chemistry data base would cost approximately $7.00 for each week the service is rendered. Off-line printing charges are at the rate of 10¢ per printed page.

For further information and to arrange for an appointment with an Information Specialist, call: 253-7746.

(A)During the initial "break-in" period, users will receive a credit for the Information Specialist's time up to a maximum credit of $50.00. This credit is good until the end of the academic year, in June 1974.

(4)

Fig. C1 continued.

NASIC*/CA-CONDENSATES
AUTOMATED BIBLIOGRAPHIC
SERVICES FOR RESEARCH

SERVICES FOR CHEMISTRY AND
CHEMICAL ENGINEERING

THE DATA BASE

CA-Condensates is the chemistry data base corresponding to the publication Chemical Abstracts produced by the Chemical Abstracts Service of the American Chemical Society. The worldwide data gathering capability of CAS provides comprehensive coverage of the literature in all fields of chemistry and disseminates bibliographic information in this literature in both printed and machine-readable form. The data base is issued on a weekly basis, each issue covering one half of the total subject scope of the data base. Searches may be tailored to the odd or even numbered issues.

NASIC/CA-CONDENSATES AT MIT

Computer-based bibliographic services including CA-Condensates add a new dimension to information retrieval traditionally performed by manual techniques. NASIC services, available through the MIT Libraries, enable you to employ a more exhaustive combination of retrieval parameters at relatively low cost to produce rapid and highly relevant search results.

USER ASSISTANCE

The CA-Condensates data base is accessible in interactive on-line or remote batch modes. MIT Information Specialists are available to assist you in the use of these services. For information about types of services available and associated costs, and to arrange for an appointment with an Information Specialist, contact the NASIC Coordinator's office:

253-7746

ROOM 10-400

*NORTHEAST ACADEMIC SCIENCE
INFORMATION CENTER

A Program of the New England Board of Higher Education, NASIC is supported by the National Science Foundation under Grant No. GN37296.

(1)

NASIC/CA-CONDENSATES

SUBJECT AREAS

Chemistry and Chemical Engineering related topics are covered as in Chemical Abstracts, in five major sections:

1. Biochemistry Sections (CBAS)
2. Organic Chemistry Sections (CAOS)
3. Macromolecular Sections (CAMS)
4. Applied Chemistry and Chemical Engineering Sections (CAAS)
5. Physical and Analytical Chemistry Sections (CAPS)

COVERAGE

The CA-Condensates data base covers the chemistry-related literature published in over 12,000 journals as well as patents issued by 26 countries. New books, conference proceedings, and government research reports are regularly monitored to select those documents pertinent to the chemical sciences. The on-line data base references information from the several issues of Chemical Abstracts published since 1970. The off-line data base, begins with Chemical Abstracts Volume No. 69, first published in July 1968.

FILE SIZE AND UPDATING

The on-line CA-Condensates data base presently contains records for over 1,100,000 documents, while the off-line data base contains over 1,500,000 records. Approximately 14,000 new records are added to the data base each month. The on-line file is updated biweekly. The off-line file is maintained in two parts: biochemistry and organic chemistry in one part (corresponding to the odd-numbered issues of Chemical Abstracts) and the other three sections in a second part (even numbered issues of Chemical Abstracts). Each part is updated separately on an alternating week basis.

RECORD CONTENT

The CA-Condensates data base includes the following information elements from the corresponding issues of Chemical Abstracts: titles of papers, patents, reports; names and organizational affiliation of authors and/or assignees; bibliographic citations, language of document and subject indexing.

(2)

Fig. C2 NASIC/CA-CONDENSATES Brochure

NASIC/CA-CONDENSATES

ACCESS OPTIONS

NASIC's computer-based bibliographic data bases on Chemistry and Chemical Engineering literature are available for search in on-line or off-line modes.

SERVICES AVAILABLE

Current awareness and retrospective search services tailored to your specific interests, are now available at the MIT Libraries. The Current Awareness Service provides routine periodic notification of the most recent publications which match the subscribing researcher's interest profile. Retrospective Search Services, generally covering several years of publications, are also available on-line or off-line. For many of the citations obtained through your NASIC search, you may obtain through the MIT Libraries a photocopy (or in some cases, hard copy or a microfilm copy) of the full text of the document.

COST OF SERVICES

Charges to academic users will be based on the following rates:

Current Awareness $370 (annual subscription, weekly delivery) (A)

Retrospective Search

On-line: $55 per connect hour at terminal; minimum charge $5.

Off-line: $166 per year of data base searched(A)

Information Specialist assistance; $8 per hour; minimum charge $5.(B)

Off-line computer printouts @ ten cents per page (4x6 card stock also available @ two cents each extra)

(A)Half-price if only odd or even issues searched

(B)During the initial "break-in" period, users will receive a credit for the Information Specialist's time up to a maximum credit of $50.00. This offer expires June 1974.

(3)

NASIC - A REGIONAL RESOURCE

NASIC - The Northeast Academic Science Information Center - is being developed by the New England Board of Higher Education (NEBHE) to provide the Northeast area with a central access point to the nation's growing and diverse information resources in computer-readable form. This development is being aided by staff of the Association of Research Libraries, the Massachusetts Institute of Technology and by other organizations and consultants working under subcontract to NEBHE.

By aggregating data bases and existing information services, NASIC provides comprehensive and in-depth services to users. NASIC thus aids in increasing the capabilities of the Northeast's academic community.

The increasing availability of computer-readable data bases now makes it possible for R&D personnel to keep up with the proliferation of professional journals and with the growing record of experimental and statistical data. Computers permit searching of hundreds of thousands of references in the time it would take a human researcher to read one page.

NASIC AT MIT

To assist in meeting the information needs of the MIT community, a number of computerized bibliographic services are already available for several subject disciplines. Others will soon be added and, eventually, all major fields of research interest will be covered.

For further information on all computer-based services available at the MIT Libraries, contact the NASIC Coordinator's office:

253-7746

Room 10-400

THE NEW ENGLAND BOARD OF HIGHER EDUCATION
40 Grove Street
Wellesley, Massachusetts 02181
(617) 235-8071

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(4)

Fig. C2 continued.

NASIC*/ERIC

AUTOMATED BIBLIOGRAPHIC

SERVICES FOR RESEARCH

SERVICES FOR EDUCATION, LINGUISTICS

AND INFORMATION SCIENCE

THE DATA BASE

ERIC (Educational Resources Information Center) is the educational data base developed and maintained by the U.S. Office of Education. Eighteen clearinghouses located throughout the United States, and now reporting to the National Institute of Education, collect, screen, index, and abstract the report and periodical literature in education and education-related fields.

NASIC/ERIC AT MIT

Computer-based bibliographic services including ERIC add a new dimension to information retrieval traditionally performed by manual techniques. NASIC services, available through the MIT Libraries, enable you to employ an exhaustive combination of retrieval parameters at relatively low cost to produce rapid and highly relevant search results.

USER ASSISTANCE

The ERIC data base is accessible in interactive on-line or remote batch modes. MIT Information Specialists are available to assist you in the use of these services. For information about types of services available and associated costs, and to arrange for an appointment with an Information Specialist, contact the NASIC Coordinator's office:

253-7746

ROOM 10-400

*NORTHEAST ACADEMIC SCIENCE

INFORMATION CENTER

A Program of the New England Board of Higher Education, NASIC is supported by the National Science Foundation under Grant No. GN37296.

(1)

NASIC/ERIC

SUBJECT AREAS

Education and education-related topics in ERIC include:

- Adult Education
- Counseling & Personnel Services
- Disadvantaged
- Early Childhood Education
- Educational Management
- Educational Media & Technology
- Exceptional Children
- Higher Education
- Junior Colleges
- Languages & Linguistics
- Library & Information Sciences
- Reading & Communication Skills
- Rural Education & Small Schools
- Science, Mathematics & Environmental Education
- Social Studies/Social Science Education
- Teacher Education
- Tests, Measurement & Evaluation
- Vocational & Technical Education

COVERAGE

The ERIC data base covers educational literature publisned since 1969* and contains all citations published in Research in Education (RIE) and Current Index to Journals in Education (CIJE), the two major printed monthly products of the ERIC system.

FILE SIZE AND UPDATING

The ERIC file currently contains records for over 135,000 documents. Approximately 1000 new reports and 1500 new journal articles selected from over 500 journals are added monthly into the ERIC file.

RECORD CONTENT

The ERIC record includes the following information for each document; the title, author name(s) and organizational affiliation, the publication citation (when and where published), and availability data (including price for microfiche or paper copy from ERIC), subject indexing and sponsoring agency with contract or grant number. RIE also has an abstract for all primary documents. Searching is possible on any item of information in the record.

*A limited number of documents going back to 1956 is also included.

(2)

Fig. C3 NASIC/ERIC Brochure

NASIC/ERIC

ACCESS OPTIONS

NASIC's computer based bibliographic data bases on Educational Literature are available for search in on-line and off-line modes.

SERVICES AVAILABLE

Current awareness, and retrospective search services tailored to your specific interests, are now available at the MIT Libraries. The Current Awareness Service provides routine periodic notification of the most recent publications which match the subscribing researcher's interest profile. Retrospective Search Services, generally covering several years of publications, are also available on-line and off-line. For many of the citations obtained through your NASIC search, you may obtain through the MIT Libraries a photocopy (or in some cases, hard copy or microfilm copy) of the full text of the document.

COST OF SERVICES

Charges to academic users will be based on the following rates:

Current Awareness: $85[A] (annual subscription, quarterly delivery)

Retrospective Search

On-line: $44 per connect hour at terminal; minimum charge $5.

Off-line: $76 per year of data base searched [A,B]

Information Specialist assistance; $8 per hour; minimum charge $5.[C]

Off-line computer printouts @ ten cents per page (4x6 card stock also available @ two cents each extra)

[A] Half charge if only RIE or CIJE searched

[B] RIE search for 1956-68 is treated as one year @ $38.00

[C] During the initial "break-in" period, users will receive a credit for the Information Specialist's time up to a maximum credit of $50.00. This offer expires June 1974.

(3)

NASIC - A REGIONAL RESOURCE

NASIC - The Northeast Academic Science Information Center - is being developed by the New England Board of Higher Education (NEBHE) to provide the Northeast area with a central access point to the nation's growing and diverse information resources in computer-readable form. This development is being aided by staff of the Association of Research Libraries, the Massachusetts Institute of Technology and by other organizations and consultants working under subcontract to NEBHE.

By aggregating data bases and existing information services, NASIC provides comprehensive and in-depth services to users. NASIC thus aids in increasing the capabilities of the Northeast's academic community.

The increasing availability of computer-readable data bases now makes it possible for R&D personnel to keep up with the proliferation of professional journals and with the growing record of experimental and statistical data. Computers permit searching of nundreds of thousands of references in the time it would take a human researcher to read one page.

NASIC AT MIT

To assist in meeting the information needs of the MIT community, a number of computerized bibliographic services are already available for several subject disciplines. Others will soon be added and, eventually, all major fields of research interest will be covered.

For further information on all computer-based services available at the MIT Libraries, contact the NASIC Coordinator's office:

253-7746

Room 10-400

THE NEW ENGLAND BOARD OF HIGHER EDUCATION
40 Grove Street
Wellesley, Massachusetts 02181
(617) 235-8071

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(4)

Fig. C3 continued.

NASIC*/INFORM

AUTOMATED BIBLIOGRAPHIC SERVICES FOR RESEARCH

SERVICES FOR BUSINESS MANAGEMENT

THE DATA BASE

INFORM is a business management oriented data base produced by Abstracted Business Information, Inc. This data base covers approximately 280 journals specializing in the areas of finance, management, economics, statistics, business law and marketing.

NASIC/INFORM AT MIT

Computer-based bibliographic services including INFORM add a new dimension to information retrieval traditionally performed by manual techniques. NASIC services, available through the MIT Libraries, enable you to employ a more exhaustive combination of retrieval parameters at relatively low cost to produce rapid and highly relevant search results.

USER ASSISTANCE

The INFORM data base is accessible in the interactive on-line mode. MIT Information Specialists are available to assist you in the use of these services. For information about types of services available and associated costs, and to arrange for an appointment with an Information Specialist, contact the NASIC Coordinator's office:

253-7746

Room 10-400

*NORTHEAST ACADEMIC SCIENCE INFORMATION CENTER

A Program of the New England Board of Higher Education, NASIC is supported by the National Science Foundation under Grant No. GN37296.

(1)

NASIC/INFORM

SUBJECT AREAS

The INFORM data base reflects comprehensive coverage of the business literature through references to feature articles from well known journals including:

Banking
Bests Review H/L
Bests Review P/L
Business Horizons
California Management Review
Duns Review
Fortune
Harvard Business Review
Personnel
Personnel Journal
Public Utilities Fortnightly
Sales Management
Sloan Management Review
Technology Review (MIT)
Journal of Marketing
Journal of Taxation
Nations Business

COVERAGE

The INFORM data base covers the major business management-related literature published in over 280 journals since August 1971.

FILE SIZE AND UPDATING

The INFORM file contains approximately 10,000 records. An average of 900 records are now added monthly by ASI into the INFORM file. Updates are searchable independently to provide a current awareness service.

RECORD CONTENT

The INFORM record contains the title, author, abstract, the publication citation and subject indexing as well as other categories of information.

(2)

Fig. C4 NASIC/INFORM Brochure

NASIC/INFORM

ACCESS OPTIONS

NASIC's computer based bibliographic data base on business related literature is available for search in an on-line mode.

SERVICES AVAILABLE

Current awareness and retrospective search services tailored to your specific interests, are now available at the MIT Libraries. The Current Awareness Service provides periodic notification of the most recent publications which match the subscribing researcher's interest profile. Retrospective Search Services, generally covering several years of publications, are also available on-line. For many of the citations obtained through your NASIC search, you may obtain through the MIT Libraries a photocopy (or in some cases, hard copy or microfilm copy) of the full text of the document.

COST OF SERVICES

Charges to academic users will be based on the following rates:

Current Awareness (available through periodic on-line searching of the updates)

Retrospective Search

On-line: $67 per connect hour at terminal; minimum charge $5.

Information Specialist assistance: $8 per hour; minimum cnarge $5.(A)

Off-line computer printouts @ ten cents per page.

(A)During the initial "break-in" period, users will receive a credit for the Information Specialist's time up to a maximum credit of $50.00. This offer expires June 1974.

(3)

NASIC - A REGIONAL RESOURCE

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Room 10-400

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Wellesley, Massachusetts 02181
(617) 235-0021

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(4)

Fig. C4 continued.

MEDLINE
at
MIT

MEDLINE

The MIT Libraries offer a new service:

Automated Search of the recent literature

of biology, medicine, and related sciences

through MEDLINE, an on-line, computer-stored bibliographical information service operated by the National Library of Medicine.

MEDLINE indexes the 1200 leading journals in the biomedical fields, and is more up-to-date than the published Index Medicus.

MEDLINE will be available to the MIT community, on a fee-for-service basis,

Monday through Friday, by appointment

at five divisional libraries:

Science
Barker Engineering
Dewey
Rotch
Humanities

An Information Specialist will be on hand at these libraries to explain and operate the system, and to show you how to devise a search strategy that will identify recent publications relevant to your research interests.

An on-line search can produce a printed list of references that you can take with you. Full bibliographies can also be printed off-line and sent to you by mail. Special searches of the most recent citations to be included in a forthcoming issue of Index Medicus are also available.

For information about services and costs, and to arrange an appointment with an Information Specialist, call the MEDLINE Coordinator's Office: 253-7746, Room 10-400.

(1)

The data base

MEDLINE is an on-line, interactive bibliographical information retrieval system operated by the National Library of Medicine. The data base is stored in computers in different parts of the country, and is now accessible through an international communications network known as TYMSHARE.

Searching with MEDLINE gives faster and more up-to-date results. It indexes the 1200 leading biomedical journals, using the standard Medical Subject Headings, which are arranged in categories such as:

Anatomical Terms
Organisms
Diseases
Chemicals and Drugs
Psychiatry and Psychology
Biological Sciences
Physical Sciences
Health Care
Biochemistry

MEDLINE includes about 60 percent of the material in Index Medicus.* It covers the last three years and is updated monthly. New citations are available several weeks before they can appear in the printed index.

The system now includes about 500,000 records, each of which contains these items:

Author
Title
Journal citation
Year
Language
Subject headings

The MEDLINE system is more versatile than the ordinary printed index because it may be searched not only by subject and author, but in several other ways. Subject headings and search results may be combined in various ways to achieve a close match with your research interests.

* Note, however, that full Index Medicus coverage is available with the SDILINE file described on opposite page.

(2)

Fig. C5 MEDLINE Brochure

Kinds of Service

MEDLINE is normally used for an on-line search of the complete data base, with an immediate printout of a list of all documents for the last three years that match the user's request.

A printout can present any combination of the bibliographical items included in the records. It can be a list of titles only, or of authors and titles, or it can include all the information stored. If a list is long and not needed immediately, it can be printed off-line at reduced costs and sent by mail.

The on-line, interactive feature of MEDLINE means that the user is in continuous conversation with the computer so that he can modify and refine his search as he goes along. A skillful operator can use the system in an exploratory way to improve the effectiveness of the search. A first attempt often yields a list too long or too short to be useful. The Information Specialist can suggest various techniques for broadening or narrowing the search, and various ways of combining lists to identify the relevant documents. This kind of exploratory work with the aim of refining the definition of the bibliographical problem is one of the most important uses of the system.

The primary task of the Information Specialist is to assist you in translating your problem statement into the language of the system in order to help you to maximize the satisfaction you derive from the system and to minimize the cost of making a search. This user interaction with the Information Specialist may take half an hour or more to develop an appropriate search strategy.

A subsystem known as SDILINE contains the citations to be included in the forthcoming issue of Index Medicus and is separately searchable. SDILINE differs from the main MEDLINE data base in several ways: it covers the full range of journals in Index Medicus rather than the MEDLINE selection, and each significant word in the title is searchable. (In MEDLINE, titles are not directly searchable).

(3)

Cost

The charge for assistance by the Information Specialist is $8 per hour with a minimum charge of $5.*

In addition, the charge for time spent using the terminal is $18 per hour with a minimum charge of $5. One-third of this fee goes to the National Library of Medicine which is subsidizing a major portion of the MEDLINE costs. The remainder goes to M.I.T. to recover its costs.

There is also a charge for off-line printouts at the rate of ten cents per printed page.

A typical search might take a half hour at the terminal and a total of one hour with the Information Specialist for a total charge of $17.*

Other Data Bases

The MEDLINE service is one element of a comprehensive program of bibliographical information-retrieval services now being planned by the MIT Libraries, to cover the major fields of research interest at MIT. The program is designed as an integrated service with a number of different data bases all available from the same terminal under the guidance of an experienced Information Specialist.

The integrated MIT service is currently an experimental node in a regional network of information centers in university libraries. This network is known as the Northeast Academic Science Information Center (NASIC), and is being developed by the New England Board of Higher Education under a grant from the National Science Foundation, with the cooperation of the MIT Electronic Systems Laboratory.

At present, MEDLINE is not a part of the NASIC system, but is made available at the same terminals at MIT through the cooperation of the New England Regional Medical Library Service (NERMLS).

*During the initial "break-in" period, academic users will receive a credit for the Information Specialist's time up to a maximum credit of $50.00. This credit expires in June 1974.

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(4)

Fig. C5 continued.